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The IRON AGE

OCTOBER 30, 1947

NEWEST DEVELOPMENT IN CONTINUOUS BUTT WELD PIPE

Aetna-Standard announces another improvement in the manufacture of pipe in the continuous butt weld process. A new 10-stand forming and welding mill in place of the conventional 6-stand mill.

The 10-stand mill produces three distinct production and cost advantages:

1. ***Much greater output.*** Production will be as much as 50% greater on some sizes of pipe than with mills now in use. The reason—wider skelp, greater reduction and elongation.

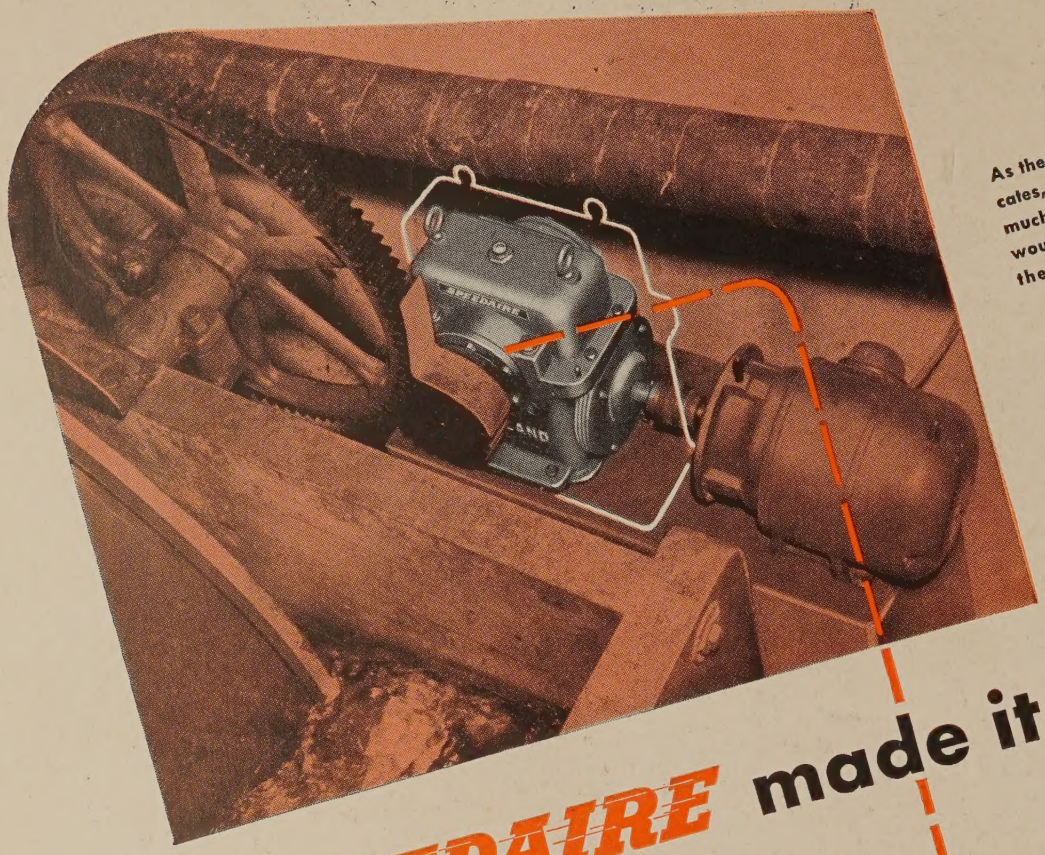
2. ***Higher furnace efficiency.*** Use of wider skelp for the small sizes of pipe utilizes furnace capacity to better advantage. Speed through furnace need not be increased to increase production.

3. ***Better quality.*** It has been proven that the more work done in reducing increases quality of weld.

DESIGNERS AND BUILDERS to the Steel, Non-Ferrous and Chemical Industries

THE AETNA-STANDARD ENGINEERING COMPANY - YOUNGSTOWN, OHIO

ASSOCIATED COMPANY: HEAD WRIGHTSON & COMPANY, LTD., MIDDLESBROUGH, ENGLAND



As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

SPEEDAIRE made it possible

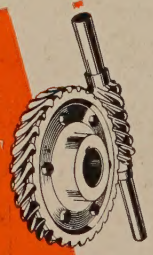
THE layout of this paper box plant allows little clearance for the Wood Screen drive. As this photo shows, motor and speed reducer are mounted on a short, narrow ledge. There is not enough room for a standard drive. Only a compact, powerful Speedaire would go in the limited space available.

Speedaire not only saved space; it saved weight and saved money. A standard worm-gear unit to handle the load would have cost 19% more, weighed 30% more and required 61.4% more space.

Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantage of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

For full description, send for Catalog 300. The Cleveland Worm & Gear Co., 3252 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.



CLEVELAND
Worm Gear
Speed Reducers

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries $20 per year. Single Copies 35¢. Annual Review Number, $2.00. Vol. 160, No. 18.

The *new* NORTON TYPE CTU CYLINDRICAL GRINDERS

PERHAPS you saw them in action yourself at Chicago, saw how they were designed for your *maximum convenience* — easy to operate, easy to maintain — and to give you *minimum production costs.*

Whether your production requirements are large volume or small you'll like the steady, dependable operation of the new Norton Type CTU's. Their ability to produce high accuracy at high speed assures the favorable work cost that is so essential to meet today's competition.

The Type CTU's are available in swing capacities of 6" and 10", in several lengths in each, and either plain or semiautomatic arrangements. Catalogs giving further details on request — no obligation.

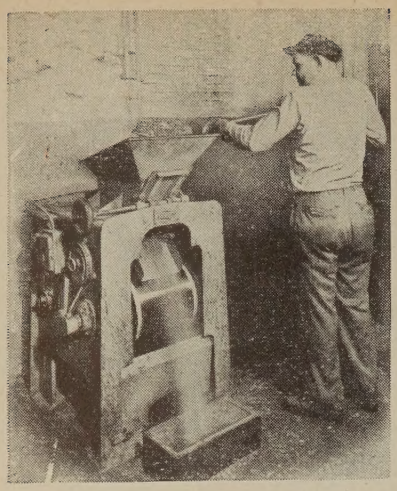
NORTON COMPANY, WORCESTER 6, MASS.
Distributors in All Principal Cities

M-552

DESIGN HIGHLIGHTS of the Type CTU

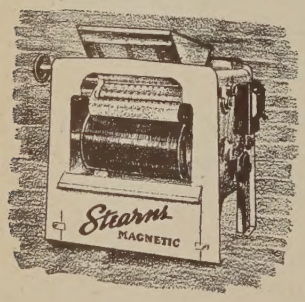
- Base ways protected at all times by space-saving steel strip guards.
- Smooth all Vee-belt driven headstocks.
- Separate right and left hand table dwell controls.
- Automatic wheel feed at each table reversal.
- Automatic coolant control.
- Automatic work start and stop with jogging control also provided.
- Hinged wheel guard cover and rear base design facilitates wheel changes.
- Wheel feed controls easily operated and conveniently grouped.
- Sensitive, easily operated hand table traverse.
- Piston rods always in tension —no buckling.
- Pumps and electrical equipment located for maximum accessibility.
- Sizing accuracy and finish maintained by well proportioned design.

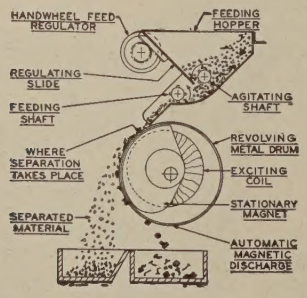
LABELING MACHINES (BEHR-MANNING DIVISION) COATED ABRASIVES AND SHARPENING STONES



MAGNETIC Separators for RECLAIMING METALS

Scrap metal values go up when you use this improved Stearns Type "L" Magnetic Separator for reclaiming your brass, aluminum, babbitt and other secondary metals from turnings, borings, chips and metal refuse. Automatic, efficient, economical, a definitely profitable investment.





Stearns MAGNETIC MFG. CO.
635 S. 28th St.
Milwaukee 4, Wis.

SEPARATORS • CLUTCHES • MAGNETS

Fatigue Cracks

BY C. T. POST

Upper Crust

• • Here we'd always considered your favorite family journal as comfy as an old shoe, and envisioned the family of loyal readers as toasting their collective stockinged-feet on the nearest annealing oven as they pore through the homey pages. Therefore, it was a shock a few weeks ago when the office sophisticate laid on our desk a copy of the *New Yorker* opened to a full-color two-page photograph of Pittsburgh's Duquesne Club lounge. Prominent on the magazine table in the foreground was your f.f.j., big as life, keeping a respectably formal distance from a neighboring *National Geographic*. The advertiser who paid for this lavish panorama proclaimed that here was a place where "people of means and influence congregate," which was just what a melter at J. & L. had whispered to us as we had slunk past the club a few days before.

We'd hardly gotten through telling the editors that now they had better watch their grammar, when someone shoved a copy of the latest *Printers' Ink* in our hands. Sure enough, there was another full-color advertisement, this time showing an expansive executive desk, neatly piled with the morning's mail, obviously prepared for a tycoon's arrival at 10 a.m. None of the other mail was opened, but there was IRON AGE again, carefully removed from its envelope, hard by the top of the stack.

After the shop's concrete floors, it's going to be kind of nice to feel those thick carpets tickling our insteps, and we're confident that the family can whack out a spry tune on the desk buzzers. But that standoffish pose of *National Geographic* kind of hurts. Maybe if we brush up on the nesting habits of the Hungarian egret we can strike up a conversation.

Housing Shortage

• • This season of the year, as during the trout season, you can't believe everything you hear. A lovesick young secretary we know has been wearing an engagement ring nearly a year, but can't add the slim binding band to her finger until a place to live is secured. The search has been intense and extensive.

Finally, after a discouraging day scouring a northern Westchester hamlet, the couple were standing on the station platform, overheard this snatch of conversation:

". . . we hunted everywhere around here for two weeks without much luck, and then yesterday we saw seven apartments in the place right behind us."

This was too much. The couple turned and pounced on the speaker simultaneously.

"Where are these apartments?" they gasped.

"Apartments?" The man was puzzled.

"The seven that you saw yesterday."

"Hell, lady," he explained. "I said PARTRIDGE."

Due Progress

• • When the first attorney swung down off a hanging vine to assure his client of adequate damages for mental anguish caused by hair pulling, there's little doubt he claimed his contingent fee in the name of Battem, Boppom, Dino & Fish. Ethical considerations of the profession forbid lurid advertising, but we feel that progress in the nomenclature of legal firms is long overdue. With the established knack of the legal profession in discovering loopholes in even the tightest drawn law of the land, we've often wondered why some budding group of barristers hasn't probed the possibilities of taking a firm name that would carry some suggestion of its type of work and the abilities of the partners.

We knew a dentist named Parker out in California who legally changed his given name to "Painless." Painless Parker cleaned up. A firm of smart criminal lawyers, taking a tip from this, could quickly effect a transformation of their individual surnames and fill the news with items like this:

"As Miss ——— left the courtroom she gave full credit for her successful defense to her attorney, Easy, Virtue, Quick-trial & Acquittal . . ."

Bet the Bar Association couldn't do a thing about it.

Magnificent

• • To show what a wide awake advertising man can do through getting to the office early and reading the Lanham Act carefully, we are advised by J. I. Capps, advertising manager of American Manganese Steel Div., that the following slogan for manganese steel now is registered with Uncle Sam as Amsco's exclusive boast: "The Toughest Steel Known."

What's more, he's got data from his metallurgical department to back him.

640 BACK SPOTFACING OPERATIONS PER HOUR AT 80% EFFICIENCY . . . . .

make this Baush 2-Way "Vee" Type Multi-Spindle Back Spotfacing Machine a profitable unit to have in any plant producing V-Type Automotive Cylinder Blocks.

A single operator can back spotface all 16 valve spring seats in a V-8 block at the rate of approximately 40 blocks per hour. Economy of man power and production such as this means PROFITS.

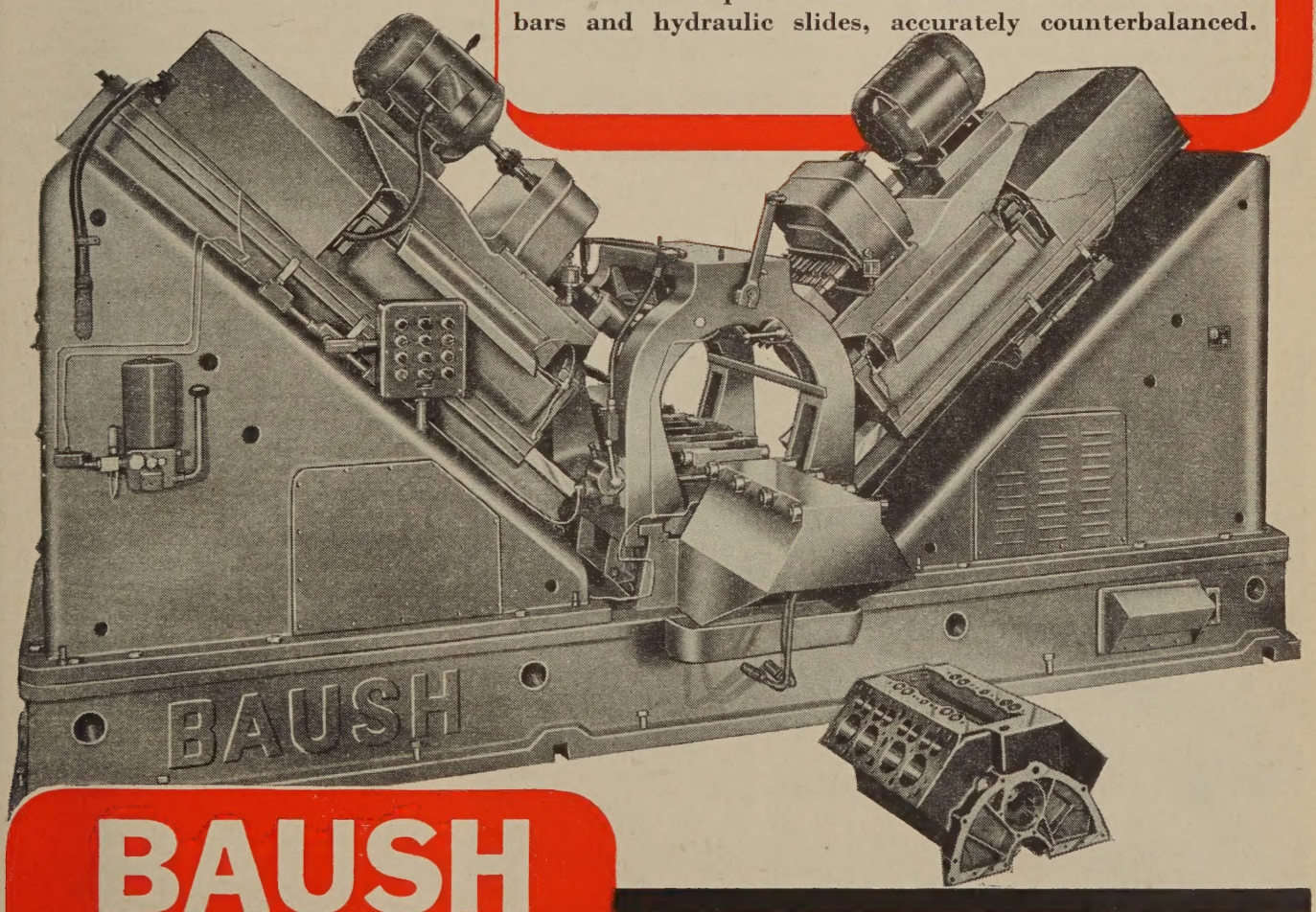
A Baush Engineer will be glad to show you how Baush equipment can speed production and help you meet today's competition. Write, phone or wire us today.

OPERATIONS:

Back spotface 16 valve spring seats in V-8 cylinder block — using (3) three revolutions of eccentric bars.

SPECIFICATIONS:

Baush 2-Way "Vee" Type (16) Spindle Back Spotfacing Machine. Two Special Units — each mounted on eccentric bars and hydraulic slides, accurately counterbalanced.



BAUSH
MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS

RUSTAVOID

Saved the day for machine tool builders at Chicago Show

Chicago Sept. 5 — The huge Chicago Dodge plant was the scene of a pre-show crisis. After the modern machine tools had been installed, sludge removed and washed down, bright metal surfaces started to tarnish and rust due to the high humidity. Near panic resulted after months of preparation and but ten days until the show opened. Then Anderson Oil men from Portland, Conn., came to the rescue. Their product, RUSTAVOID 307, was brushed and sprayed on the machines and afforded full protection immediately. Anderson attended the show to introduce Lusol, a new coolant, to the industry. Both Lusol and metal-saving RUSTAVOID received national recognition.

RUSTAVOID 307

FOR SPRAY

DIP OR BRUSH

PROTECTS MACHINE TOOLS

PROTECTS

WORK IN PROCESS

TRANSPARENT

COLORLESS

307 MEETS U. S. N. SPECS. 52C18 111

FILM THICKNESS .0003

WRITE FOR LITERATURE

AND DATA CHARTS

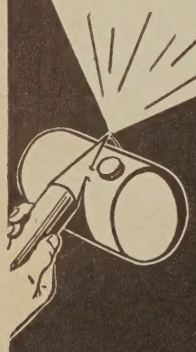
ASK ABOUT

RUSTAVOID 284-M2

U. S. N. SPEC. 52C18 Grade 2

.001 INCH FILM THICKNESS

Protects against 14 days continuous salt spray, 120 days open shed storage. Resistant to 120° heat and is soluble in lubricating oil.



ANDERSON OIL COMPANY

612 BROWNSTONE AVE. PORTLAND, CONN.

ALSO MAKERS OF *Lusol* THE NEW COOLANT

Dear Editor:

VERY CLEVER

Sir:

The last item on the Sept. 4 News-front page mentions the invention by the Russians of super-transparent glass and the item states that this development will come as "quite a surprise" to the Americans who perfected this process about 10 years ago. Upon reading this item, some readers will conclude that the Russian officials must be a dumb lot, but it seems to me that they are very clever. They have found out too many complicated secrets with baffling speed to be classed as dumb. Possibly these Russian officials realizing the true status of their 180,000,000 subjects behind the iron curtain, figure these subjects will conclude that here is another incident showing that their higher-ups at Moscow continue to be supermen. There is a long list of American inventions that can be exploited in this manner.

E. M. KEAYS
Wisconsin Co.
Milwaukee

● Your analysis of the situation is correct. It does give them infinite opportunity to point out that Russian enterprise is ever alert and ever on the ball. This brings to mind an experience which occurred about six years ago. A very elaborate article about continuous casting of metals appeared in THE IRON AGE. It was the first article on the subject and the accompanying pictures were the only ones ever made of the machines described. A year later the Russians published a paper by a Russian metallurgist on continuous casting. It purported to describe work being done in Moscow. Much of the data was obviously lifted from THE IRON AGE and the pictures were poor reproductions of those appearing in THE IRON AGE. The payoff line in the Russian article was at the end, viz. "The development of these machines and techniques are perfect examples of socialistic enterprise and imagination, and would be impossible in a capitalistic country where profit is the only motive."—Ed.

TUBE DRAWING MILLS

Sir·

Are you in a position to send us a list of all of the tube drawing mills in the U. S.?

J. COHN
Machinery Sales Dept.
E. Cohn & Sons, Inc.
Cedar Rapids, Iowa

● A list has been forwarded.—Ed.

ELECTROFORMING

Sir:

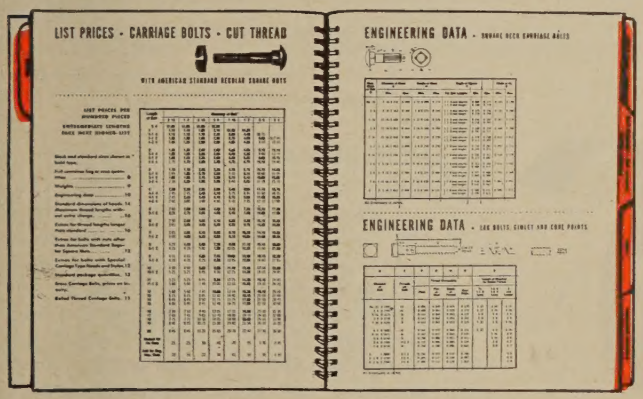
After making quite an extensive search, to no avail, for the name of a concern who does electrodepositing of iron, I am writing to you hoping you can be of assistance. I have read, somewhere, about dies being built up, over a form, by depositing iron, by electroplating over the form. Recently my mind reverted back to the article and I began to think of the

THIS FREE BOOK CONTAINS ALL THE INFORMATION YOU NEED FOR EFFECTIVE METAL FASTENING BUYING

Actual Size 8½″x 11″

THUMB INDEXED IT'S EASY TO USE

You'll want the new Sterling Bolt "Fastening Buyer's Handbook" for everyday reference. It's crammed cover-to-cover with technical information, engineering data and list prices covering virtually every one of the 200,000 metal fastening items used in every industrial field—all kinds of bolts, nuts, screws, rivets, washers and special fasteners. This wealth of information has been compiled into logical categories—in 124 full size pages—illustrated with photographs and mechanical drawings—set in large, easy-to-read type—each category thumb indexed for quick reference. It is a ready reference handbook for every bolt and nut buyer. Send for your copy today.



MAIL THIS COUPON TODAY FOR YOUR FREE FASTENER HANDBOOK

STERLING BOLT COMPANY
203 West Jackson Boulevard, Chicago 6, Illinois

Please send me, without obligation, a copy of your new easy to use catalog. Please print.

NAME_____

POSITION_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

During these times of scarcity, you may find items available in our stocks which would help you through production problems. Inform us of your needs and write for a copy of our current stock list.

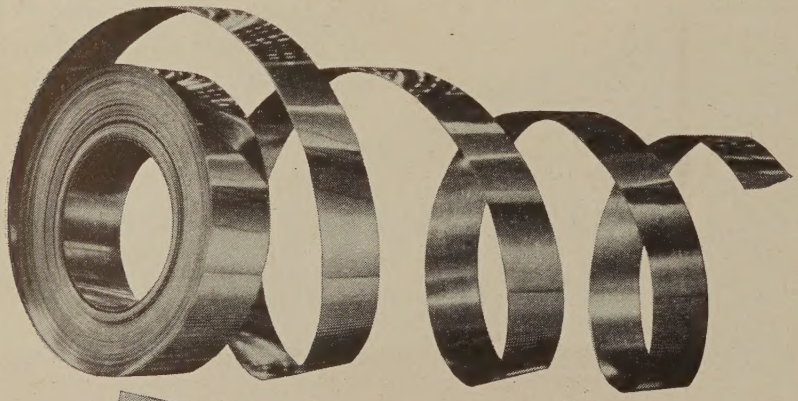
STERLING BOLT CO.
203 W. JACKSON BLVD.
CHICAGO 6, ILL., HAR. 9880

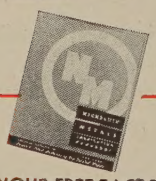
SALES OFFICES:
Union Trust Bldg., Cincinnati 2, Ohio
17 W. Market St., Indianapolis 4, Indiana
161 W. Wisconsin Ave., Milwaukee 3, Wisconsin
1228 N. Hadley Street, St. Louis 6, Missouri

ANSWERING THE QUESTION:

WHAT IS (OR "ARE") N-M

1. Nickeloid Metals are *finished* raw materials — beautiful and durable finishes of chromium, nickel, brass or copper . . . heavily plated to such base metals as steel, copper, zinc, brass or aluminum.
2. Nickeloid Metals are available in all gauges and tempers, and in a wide range of sheet sizes and coil widths.
3. Nickeloid Metals may be worked and fabricated — with reasonable precaution and skill — without injury to their highly polished surfaces, the same as most basic metals.
4. Nickeloid Metals, being FINISHED metals, require no further plating, painting or lacquering, or polishing — thus eliminating costly piece-plating after fabrication.





HERE'S YOUR FREE FACT BOOK ON **FABRICATION** OF NICKELOID METALS

A factual, data-filled brochure that may suggest new production economies to you.

Send for your copy today!

AMERICAN NICKELOID COMPANY

Established 1898

PERU 2, ILLINOIS

possibilities of using the same method for making some of the coreboxes that are now made from steel, bronze and aluminum. Possibly the same method can be used for producing core drier patterns. Any information you can furnish will be appreciated.

M. HOOK
Pattern Shop Foreman
Yale & Towne Mfg. Co.
Stamford, Conn.

● We believe the process to which you refer is electroforming and are forwarding a bibliography on recent articles on electroforming.—Ed.

GEIGER COUNTERS

Sir:

Recently I read an article wherein Geiger counters were used as fire detectors. Being a fire alarm concern ourselves, we are anxious to find out how this is done. I have written Geiger but cannot obtain information. Can you please forward the correct address . . .

R. VAN HARKEN
Purchasing Agent
J. H. Scharff, Inc.
Orange, N. J.

● A patent on the use of Geiger counters as fire detectors is held by Paul Weisz, until recently connected with the Bartol Research Foundation of the Franklin Institute, Swarthmore, Pa., but his present address is unknown. A letter addressed to him, care of the Bartol Research Foundation would be forwarded.—Ed.

WOOD SCREWS

Sir:

We are looking for a machine to manufacture wood-screws, preferably automatic. We wonder if you could send us the names and addresses of a few firms that manufacture that type of equipment.

MAURICE M. HALLIES
President
United American Enterprises Corp.
New York

● A list of firms that make such machines has been sent.—Ed.

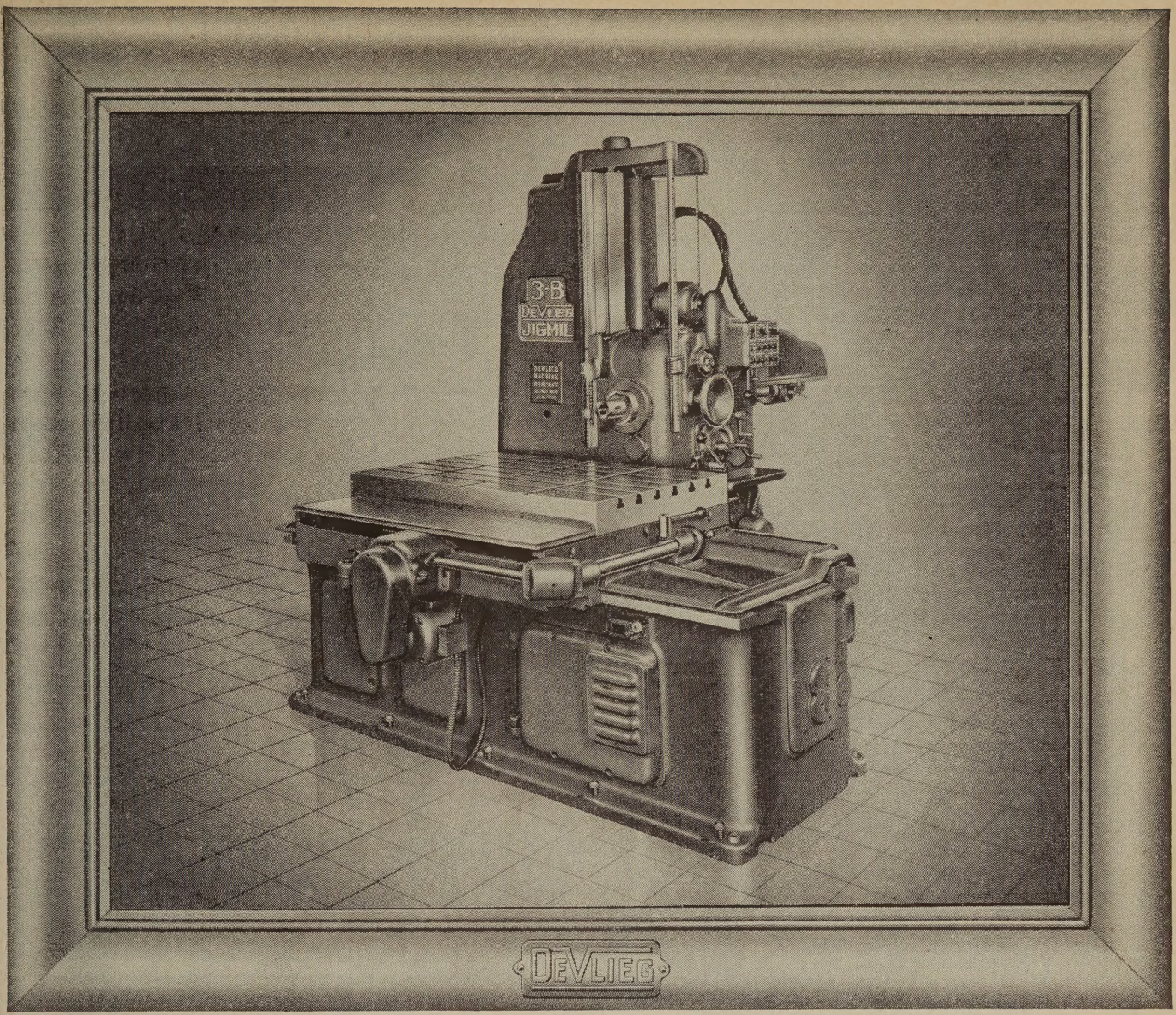
NOT USWA

Sir:

I notice in the editorial, "Steel in the Toils," in the Sept. 25 issue that you attribute to us a statement that "a small clique of profiteers is endangering the entire country." I am not sure of the source of your information, though I am certain that we have not made any such statement. I am attaching for your information a copy of the testimony which was presented to the Steel Subcommittee. We have tried throughout in presenting our position on this subject to refrain from any such statements as those which you attribute to us. While we do not mind being quoted we would prefer that such quotations reflect accurately the statements which we have made.

OTIS BRUBAKER
Director of Research
United Steelworkers of America
Pittsburgh

● You are quite right. The statement was made by Walter P. Reuther in an address



The World's Finest Boring and Milling Machine

THIS new model 3-B JIGMIL has automatic power means to position the spindle from one location to another accurately to within much less than .0001 (one-ten thousandths part of an inch). Thus, extreme laboratory accuracy is conveniently available with ordinary skill that would normally make such precision very high in cost. This, and many other refinements, go further to prove that the JIGMIL Idea is a totally new approach to the problems of precision boring at a new low cost.

DeVLIEG MACHINE COMPANY DEVLIEG JIGMIL **450 FAIR AVE. FERNDALE 20, (Detroit) MICH.**

The Pittsburgh Steel Foundry Corp.

OF GLASSPORT, PA.

• . . . does a 100 hour job in 44 minutes

AIRCO TECHNICAL SALES SERVICE REPORT

PROBLEM: To remove this 52-inch, 7-foot high riser from a 50-ton cast steel anvil block.

SOLUTION: We recommended cutting with an Airco No. 40 Radiagraph equipped with a Style 6740 water-cooled torch. Two cuts were made; the first five inches from the finish line. Then, after inspection (no defects were visible), the second and last cut was made one inch from the body of the block. This entire job was completed in 44 minutes.

Pittsburgh Steel Foundry Corp. estimates flame cutting to this close tolerance permitted a saving of approximately 100 hours machining time.

R. F. Helmkamp

Airco Technical Representative

Airco's Technical Sales Division is at the call of all industry in applying Airco processes and products in the solution of their problems. If you have a metal working problem, ask to have a Technical Sales Division man call. Address: Dept. IA-6987, Air Reduction, 60 East 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., Houston 1, Texas.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

TECHNICAL SALES SERVICE—ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

entitled "The Steel Monopoly and Your Job," made before the National UAW-CIO General Motors Council on July 25, 1947: "The American people cannot tolerate a situation where the private economic decision of a small clique of profiteers can jeopardize the welfare and security of the whole population." USWA was erroneously used in place of UAW.—Ed.

PLATE BENDING FACILITIES

Sir:

. . . We are desirous of locating a plant which has idle plate bending and forming facilities to form the bodies of No. 10 or 12 gage steel into household fuel oil storage tanks, 275-gal. capacity, either 22 or 26 in. long; also the heads to match the ends. We have our own welding facilities and to this extent could help ourselves . . .

A. J. HOFMANN
A. J. Hoffman
Narberth, Pa.

INTEREST FROM URUGUAY

Sir:

I refer to the issue of June 26, p. 102. There appears a photo of a car named Tucker. Could you give me the name and full address of the manufacturer of that car?

WALTER POLVARINI
Montevideo, Uruguay

● Tucker Corp., 700 N. Hudson Ave., Chicago 20, Ill.—Ed.

PUSHBUTTON AGE

Sir:

In some New York state mill there is a guy operating a special vertical press by means of six pushbuttons—two for his hands, two for his feet, and two for his knees. For a time he could not perform all the operations, but lately the engineers added the pushbuttons for his knees. I'm writing you on the chance you have heard about this Handy Andy, maybe ran a piece about his press. I'd like to do a short about him myself; he's a pioneer in the Pushbutton Age.

ROBERT M. YODER
Associate Editor
The Saturday Evening Post
Philadelphia

● No punch press we have seen requires such a galaxy of buttons. However, it is possible that somebody has rigged up an affair like this. We shall try to track it down and see if this story does have some basis in fact.—Ed.

BASE PRICES FOR WIRE

Sir:

I should be much obliged if you would kindly advise me where and how I could secure the list of base prices of wire products. . .

CHARLES LEONARD
Consul General of Belgium
New Orleans

● Base prices for merchant wire products are listed each week in the price pages of THE IRON AGE, a tear sheet of which is

want . . .
longer bearing life?

SUPERFINISH
. . . assures it!

● Yes, you can double—triple—quadruple—the life of bearings with simple, precautionary measures which take only a few minutes.

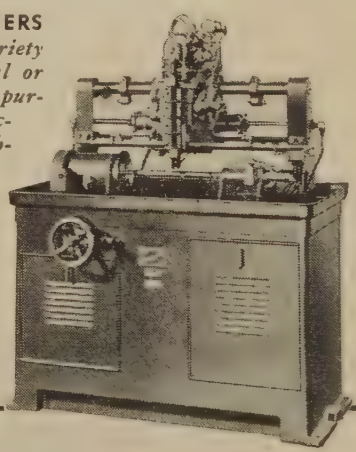
Examine a finely ground surface. No matter how smooth it may appear, it has defects in the form of grinder scratches, chatter and feed marks, and "smear metal" softened by the heat of grinding wheels. When these tiny metal ridges rub together, they rupture the protective oil film to cause scoring, excessive wear and increased clearances.

Superfinishing removes these defects—produces a bearing surface that is virtually frictionless. And its life is almost unlimited.

Superfinishing is a much quicker and more economical process than you may think. And it pays for itself many times over in better service and lower replacement cost.

Ask your nearest Gisholt Representative for the facts about Superfinishing.

GISHOLT SUPERFINISHERS *are available in a variety of types for cylindrical or flat surfaces; for general purpose or continuous production work; also as attachments for use on lathes. Write for literature.*

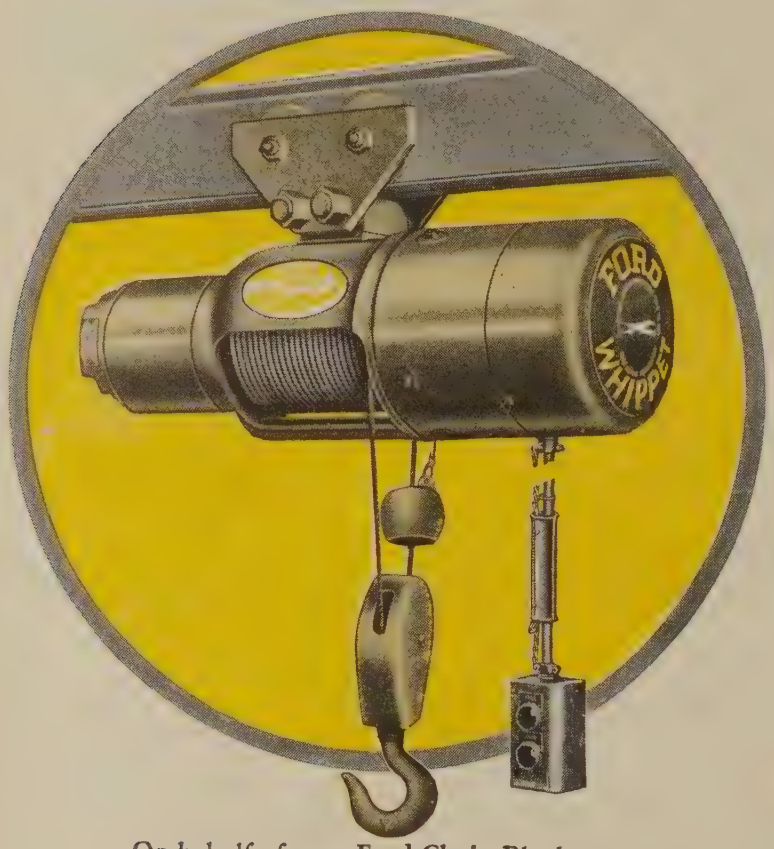


GISHOLT MACHINE COMPANY · *Madison 3, Wisconsin*

TURRET LATHES · AUTOMATIC LATHES · BALANCERS
SUPERFINISHERS SPECIAL MACHINES

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface finishing and balancing of round or partly round parts. Your problems are welcomed here.

Announcing the FORD WHIPPET ELECTRIC HOIST



On behalf of your Ford Chain Block distributor, as well as ourselves, we take great pleasure in announcing this new postwar electric hoist... The streamlined *WHIPPET* offers a high degree of simplicity, durability and accessibility of parts. Yes, the *WHIPPET* is faster, safer, more powerful, more dependable. Capacities range from 250 to 2000 pounds. Ask your distributor or send for copy of new descriptive folder DH-1325.

ACCO

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FIREARMS INTO STEEL

Sir:

Reference is made to the disposition by our company of rifles, revolvers, etc. The news item in Newsfront of the Sept. 25 issue indicates that the New York state police sold these firearms to Allegheny Ludlum Steel Corp. The state police would be without authority to sell such material to our company, and we destroyed them under supervision of the state police, blending them with a regular heat of steel.

G. R. REINDEL
Office Manager
Allegheny Ludlum Steel Corp.
Brackenridge, Pa.

PLASTIC ADHESIVE

Sir:

The Aug. 28 issue carries a brief account of the material Plasticol on p. 66. Please give us the name and address of the manufacturer or distributor of this material.

R. W. SCHLUMPF
Chief Metallurgist
Hughes Tool Co.
Houston

● See Dear Editor, Sept. 25, p. 50.—Ed.

CENTRIFUGAL CASTING

Sir:

We would kindly ask you to let us have a photostatic copy of J. D. Nesbit's article on centrifugal casting of small metal parts, which appeared in the June 19 issue.

JOHN L. ELLIS
Sintercast Corp. of America
New York.

ELECTRODES CHART

Sir:

Have you any reprints available of "Comparable Arc Welding Electrodes?" If so, I should like a copy.

CLYDE B. JENNI
Metallurgist
General Steel Castings Corp.
Eddystone, Pa.

● Copies of the chart are available at 20¢ a copy.—Ed.

STEEL BALLS

Sir:

We need some balls to go into ball bearings in children's tricycle wheels. We would like to buy them in bulk. Would you please send us the names of manufacturers that could supply us with same.

A. M. KRAMER
Kramer Machine Co.
Houston

● A list of producers has gone forward to you.—Ed.

The IRON AGE

Vol. 160, No. 18 October 30, 1947

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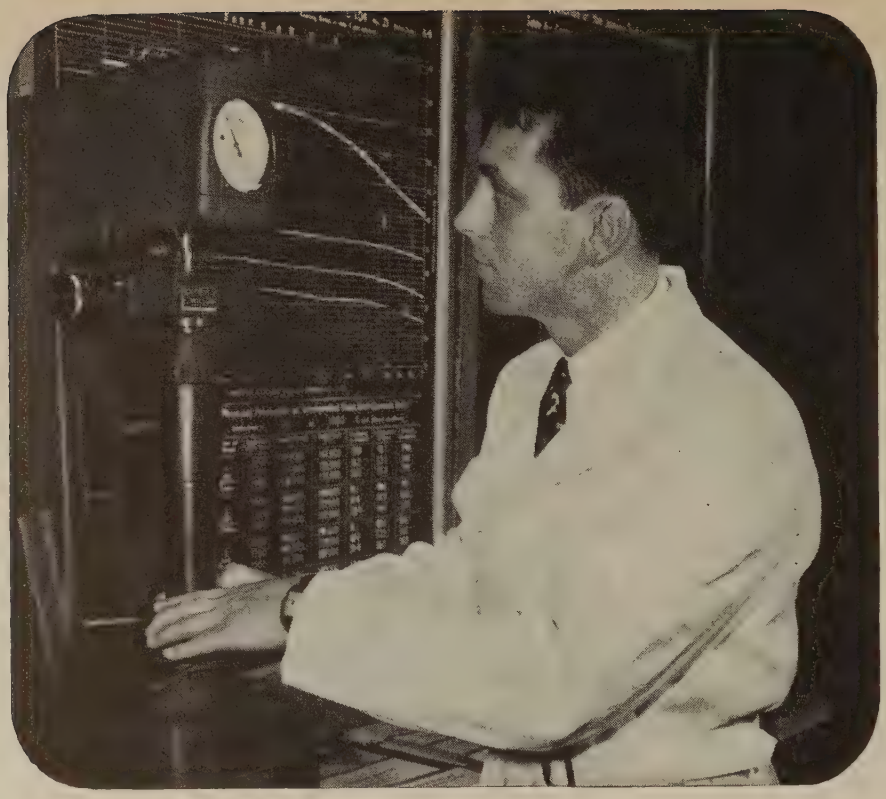

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October 30, 1947

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Back, Oh Sea!

WITH monumental disregard for public opinion, Mr. James Caesar Petrillo has mounted still another rearguard action against the steady advance of technology and mechanization. As spokesman for his Federation of Musicians, Mr. Petrillo says there are to be no more recordings. What's more, this time he talks as if he means it.

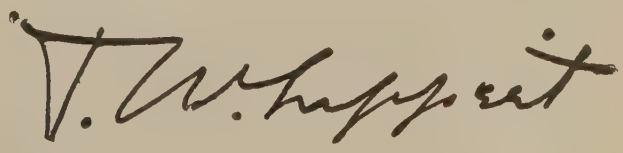
Like King Canute, who mounted his throne on the beach and bade the tide to fall back, Mr. Petrillo is dogged in his determination to maintain employment against all inroads of technological development. The sea was disobedient, and Canute the Great had to retreat to higher ground. Electronics, and the science of musical reproduction, are just as much a part of the industrial revolution as is the automobile. No doubt Mr. Petrillo realizes this and knows that the public cannot forever be thwarted in its search for convenient and inexpensive entertainment. His apparent strategy is to retreat slowly before the twin threats of the Lea and Taft-Hartley laws, skillfully protecting as best he can the featherbedding practices of his musicians.

Mr. Petrillo's struggle against the machine is not unique. It is just more conspicuous. Other unions employ the same practices, more informally perhaps, but just as effectively. On the railroads, the trainmen want crews of extra workers to go along for the ride at full pay. Painters forbid the use of spray guns and limit the width of paint brushes. The hod carrier and the mason limit the number of bricks handled, and most unions (primarily AFL unions) establish low quotas as the agreed definition of a day's work. Throughout many industries the whispered word to "slow down, Bud," is one expression that changes little from year to year. Such is the individual's all-too-human attempt to protect his own job. Such is his protest against the mass lay-offs and speed-up pressures so well remembered by older workers.

Fortunately for the country, heavy industry is not cursed by monstrous featherbedding practices. The search for maximum efficiency may be obstructed by some slow-down here and some limitation of effort there, but for many years both enlightened management and labor have speeded technical innovations obviously practicable and economic. As a consequence industrial manhour productivity has in forty years spurted ahead for a three-fold increase, which has been the very fountainhead of the "good life" as measured in worldly goods.

But even in heavy industry it has been estimated that manhour productivity would jump overnight some 15 pct if labor were to work to standards demonstrated as both practical and humane. Estimates of increases as high as 50 pct apply to those other industries overwhelmed by severe restrictive and featherbedding practices.

There seems to be little early prospect for winnowing the more subtle slowdowns and restrictions. That is a long-term task for management patiently creating an atmosphere of trust and personal interest in workers. But, the elimination of indefensible feet-dragging practices seems nearer at hand. Already the Supreme Court has upheld the Lea Act, which prevents Mr. Petrillo from forcing vendors of canned music to hire standby orchestras who never play a note. As the force of this and other rulings spreads in ever-widening circles throughout all industry, so will some of the wealth-creating capacities of the machine no longer be stultified by human foolishness.



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► An Interstate Commerce Commission order that is expected to ease the freight shortage will come into effect Nov. 1. It will use a historical basis to limit the number of cars carriers may hold in terminals for prospective loading. It also requires cars to be delivered to consignees within 48 hr of arrival at destination and allows only 48 hr for pickup of empties.

A western railroad is planning a freight car building shop with a 1000 car a month building capacity.

► The shortage of cast iron soil pipe will be completely licked within 4 months, according to a senatorial report. The same source is calling for the construction of 1.5 million homes per year.

► Use of a bright annealing treatment as a replacement for the usual cleaning and pickling operation--preparing kitchen ware for porcelain enameling, has resulted in savings of 25 pct in a midwest plant. Cost of the annealing operation is put at 15.8¢ per hundred sq ft, as compared with 20.3¢ for pickling.

► American Electric Motors, Inc., Los Angeles is giving employees with 10 years service a year-long vacation with pay. The company was organized in 1939 to manufacture motors, generators and dynamos for the government and was reorganized in 1946--they won't have to start paying off until 1956.

► Contrary to popular folklore, mere mechanization will not substantially boost the output of British coal mines. Much engineering will be needed to provide wider entries, faster handling equipment, and gradual curves to provide accommodation for conveyors--to say nothing of washing machines.

► Some 182 Russian purchasing representatives recently arrived in the United States, reporting in at Amtorg in New York before fanning out over the country buying equipment. The USSR has no dollar problem--it can pay for much of its imports in gold.

► Kaiser officials have been looking over the stainless clad field and recently visited a mill that makes this product in Western Pennsylvania.

► Auto dealers guilty of price highjacking on new cars, bonus demands, and accessory packing may be in for a rude awakening. A recent survey by manufacturers showed that 48 pct of new car buyers said that they had been unfairly treated by their dealers--it was a bombshell to many auto executives.

► Many steel rolling mills going at capacity are on thin ice as available spare parts stocks are low. One large slabbing mill in the Chicago area has been operating all out for months without any spare backup roll bearings.

The steel producer rushed special steel to the bearing maker to fabricate the bearings, but the first lot of rollers was rejected because of steel defects. The mill still has no spare bearings.

► A possible case of steel hijacking is being investigated in Chicago. The truck loaded in Gary for shipment to St. Louis ended up in Chicago. The intended consignee never saw the SHEETS but the real mystery is how the truck driver obtained his signed receipt for St. Louis delivery.

► Outlaw strikes in the steel industry since current contracts have been signed have been negligible, largely as result of confidence generated during negotiations earlier in the year.

Even those hot spots where quickie strikes due to age-old dissensions occur have seen a change in the air. All this builds up bargaining power for the union when the big wage negotiations sideshow opens in 1949.

► The steady increase in production rate and die size for aluminum die casting work has emphasized the need for high speed, automatic, easily controlled methods for feeding molten metal to the mold.

Among the promising techniques developed for this purpose are an electromagnetic method and a method employing vacuum applied to an inverted Y arrangement. This latter method, employing induction heat for maintaining the temperature in the tubes, permits feeding a measured amount directly into the injection chamber.

Oxide Conditioning Speeds

By C. B. MURTON, JR.,
Openhearth Observer, Wisconsin Steel Co., Chicago
and
M. F. HAWKES,
Asst. Professor of Metallurgical Engineering, Carnegie Institute of Technology, Pittsburgh

o o o

THE process of pickling steel is intended to remove iron oxide scale and, thus, to provide clean metal surfaces suitable for coating or cold rolling in subsequent operations. Since pickling is a requisite treatment for a large portion of the steel products marketed today, an economically sound method or combination of methods which achieves more rapid and more efficient scale removal is of great importance from an industrial point of view.

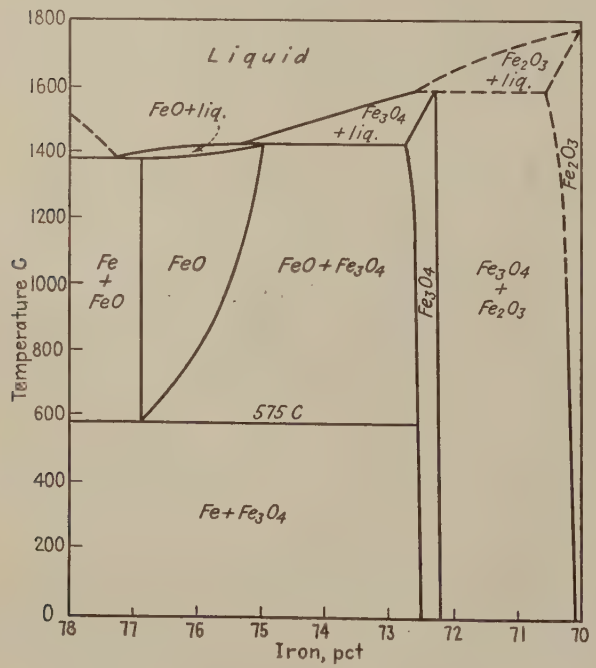
The time required to effect a clean pickle is dependent upon a variety of factors, such as the nature of the pickle liquor, use of inhibitors, temperature of liquor and steel, and the structure of the oxide layers on the steel surface. The last mentioned factor, the structure of the oxide layers, is an important and relatively unexplored determinant of pickling rate, and will be discussed in this article.[1]

Scale formed on low carbon steel above 575°C (1067°F) consists of three layers of oxides which correspond to the single phase regions of the FeO equilibrium diagram shown in fig. 1.[2] The outer and thinnest layer is Fe_2O_3. An intermediate layer of Fe_3O_4 is sandwiched between the outer Fe_2O_3 layer and the innermost layer of FeO. It has been ascertained that the FeO layer is most rapidly attacked by the pickle liquor and that attack is confined almost entirely to this layer.[3]

The FeO layer deserves special study owing to its importance in the pickling reaction. As seen in fig. 1, the FeO phase decomposes to an eutectoid mixture of Fe plus Fe_3O_4 at 575°C (1067°F) under equilibrium conditions. The extent of isothermal decomposition at constant time interval of 24 hr and the rate of decomposition at 445°C (833°F) of this phase are shown in fig. 2.[4] The rate attains a maximum value at 480°C (896°F). Consideration of the equilibrium relationship and the rate of eutectoid decomposition indicates that the microstructure of the FeO layer will be comprised of retained FeO, proeutectoid Fe_3O_4 crystals, and an eutectoid mixture of Fe and Fe_3O_4 at room temperature.

Since the controlling reaction in the pickling process appears to be electrochemical in nature and to involve Fe and Fe_3O_4[5], the effect of eutec-

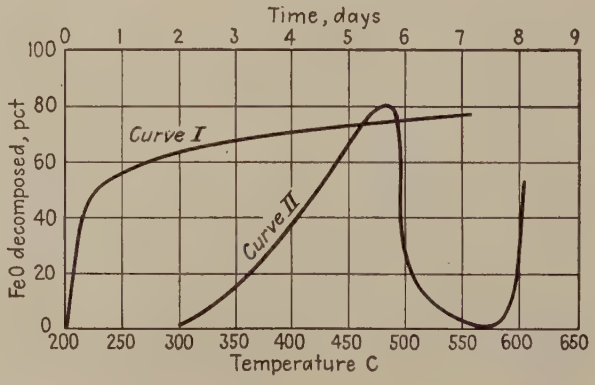
Additional recent articles concerned with pickling of steel published in THE IRON AGE, *include "Lime Treatment of Waste Pickle Liquor," June 26, 1947, p. 45, and "Analysis of Waste Pickle Liquor," July 3, 1947, p. 55.*



LEFT
FIG. 1—The FeO equilibrium diagram.[2]

o o o

BELOW
FIG. 2—Curve I expresses the rate of FeO decomposition at 445°C, (833°F). Curve II expresses the amount of decomposition occurring in 24 hr at various temperatures. It further provides a qualitative indication of the rate of decomposition at these temperatures. (Based on data from reference No. 4.)



Pickling Operations • • •

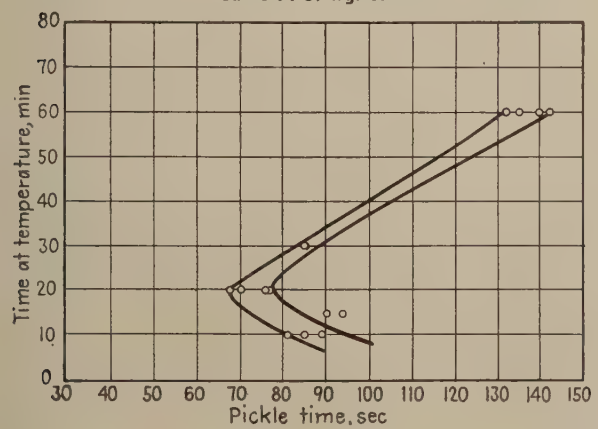
toid decomposition on pickle rate was examined in this investigation. To accomplish this specimens of low carbon sheet steel of uniform surface area were heated in an atmosphere of still air. The temperature, 750°C (1382°F), and time, 15 min, of oxidation were determined by trial and were selected to minimize blistering of the scale. After the oxidation treatment, the specimens were removed from the furnace and quenched in a neutral salt bath held at constant temperature. Since the rate of pickling is a function of the temperature and concentration of the pickle liquor, the temperature of the steel to be pickled, and the condition of the steel surface in regard to moisture, the following procedure was observed in the pickling operation. Liquor concentration was maintained at 17 to 19 pct by volume sulfuric acid in aqueous solution, and the temperature at 90°C (194°F). The specimens were flushed with tap water prior to pickling. The time required to obtain a clean pickle was determined by visual observation.

One of the factors to be considered from the standpoint of pickling speed is the structure of the oxide layers on the steel surface. A description of the various oxide components and the manner in which they affect pickling are discussed in this article. The authors also present data indicating methods of oxide conditioning to obtain rapid and efficient scale removal.

Curves A, B, and C, fig. 3, show the influence of isothermal transformation temperatures and times, on the pickling rate of low carbon sheet steel. The time of isothermal treatment is plotted on the ordinate and gives a qualitative indication of the amount of eutectoid decomposition effected. The time required to accomplish a clean pickle is plotted on the abscissa. The specimens underwent isothermal transformation at three different temperatures; curve A at 480°C (896°F) (maximum rate of decomposition), curve B at 400°C (752°F), curve C at 530°C (986°F). Fig. 2 indicates the relative rates of decomposition at these temperatures. All specimens used in obtaining data for fig. 2 were water quenched to room temperature after isothermal transformation. The pickling time decreases with an increase in the time of isothermal transformation until a minimum value of pickling time is reached in the vicinity of 30 min of isothermal transformation.

The most important fact revealed by these experiments is that transformation at 480°C (896°F) gives the most rapid pickling rates; as shown previously, 480°C is the temperature of maximum rate of decomposition of FeO. The effects noted in these curves are well beyond experimental error as can be seen in fig. 4 where all points are plotted for a similar run (discussed in the next paragraph). The dotted lines merely indicate the typical spread found in the data obtained in this investigation.

FIG. 4—Results obtained for specimens isothermally transformed at 480°C (896°F) and air cooled to room temperature. Note shift to longer pickle time in comparison to curve A of fig. 3.



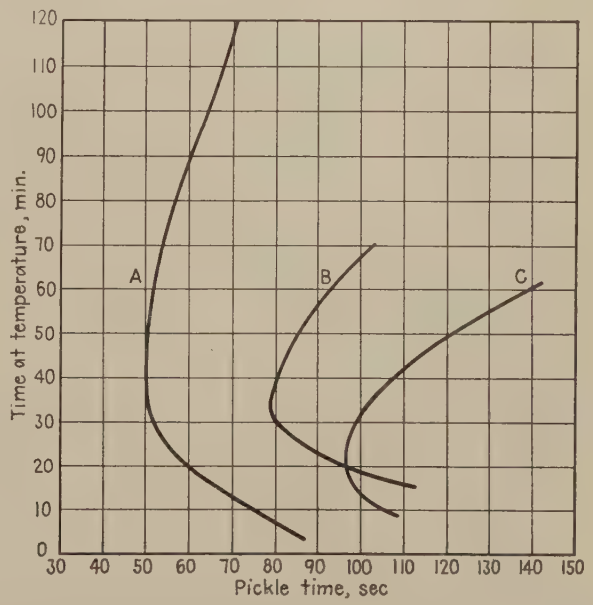


FIG. 3—Curves A, B, and C indicate the relation between pickle rate and eutectoid reaction for water quenched specimens. Curve A represents isothermal transformation at 480°C (896°F), curve B at 400°C (752°F), and curve C at 530°C (986°F).

Figs. 4 and 5 express the results of tests conducted with the same procedure as in the experiments represented by fig. 3, with the exception that the specimens for figs. 4 and 5 were air cooled instead of water quenched to room temperature after isothermal transformation. The eutectoid decompositions were carried out at 480°C (896°F) and 530°C (986°F) for figs. 4 and 5 respectively. The general configurations of these curves correspond with those of fig. 3. The rate of pickling varies with the time of isothermal transformation and reaches a maximum at about 30 min. Again, more rapid pickling rates are obtained at 480°C. Comparison of the results obtained for water-quenched and air-cooled specimens transformed at the same temperature indicates that a shift to longer times is required to effect a clean pickle when air cooling is used.

The data obtained obviously indicate that the time required to pickle low carbon steel is dependent on the structure of the FeO layer. Evidence that the presence of a certain amount of

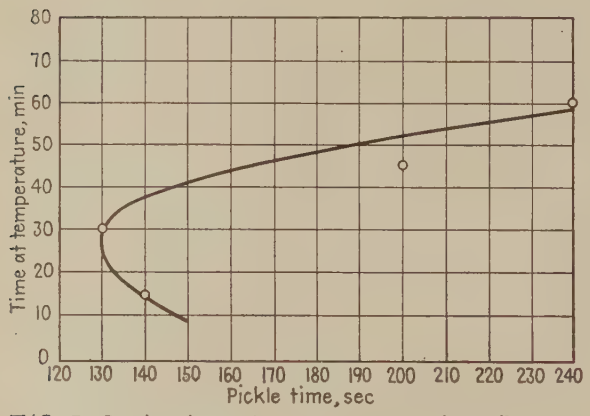


FIG. 5—Results obtained for specimens isothermally transformed at 530°C (986°F) and air cooled to room temperature. Note shift to longer pickle time as compared with curve C of fig. 3.

Fe and Fe_3O_4 crystals in the FeO layer increases the pickling rate is shown by the fact that any given rate can be attained with shorter holding times at 480°C (896°F) (temperature of maximum rate of eutectoid decomposition) than at either higher or lower temperatures.

The fact that every curve shows a maximum in pickling rate indicates, furthermore, that the particle size or the nature of the distribution of the eutectoid mixture is just as important as the amount of eutectoid products formed in determining the rate of pickling attained. The effect of eutectoid particle size might be considered analogous to aging in precipitation hardening systems. The rate of pickling varies in a manner comparable to the variation of hardness with the particle size of the precipitate. An increase in eutectoid particle size initially increases the rate; however, a critical particle size is attained at which the rate is a maximum and beyond which it decreases. The latter effect would correspond to the overaged condition encountered in precipitation hardening systems.

The difference between water-quenched and air-cooled specimens is attributed to the fact that water quenching causes cracking and disruption of the outer scale layers owing to thermal stresses and to differences in the coefficients of thermal expansion of the layers. The water quench further serves to inhibit subcritical oxidation which results in the formation of thicker Fe_2O_3 and Fe_3O_4 layers. The air cool was not drastic enough to crack the outer layers, or to inhibit subcritical oxidation. Since pickling occurs most rapidly and almost wholly within the FeO layer, the disruption of the outer layers gives the pickle solution access to the FeO layer which initiates the pickling reaction sooner than can be accomplishd with continuous outer scale layers.

The importance of oxide conditioning is manifest to individuals responsible for pickling operations in industry. Spray sequences, dip quenching, and temperature control are being used at present in many industrial operations to increase the rate of pickling. Obviously each unique industrial process will require unique oxide conditioning practice. Further, limitations are imposed upon oxide conditioning technique by other metallurgical considerations.

With the above reservations in mind, an oxide conditioning treatment for coiled sheet steel can be outlined with reasonable assurance of success on the basis of the results obtained in this investigation. The treatment prescribed must provide a fine dispersion of proeutectoid Fe_3O_4 crystals, provide the optimum particle size of the eutectoid mixture, provide the optimum amount of eutectoid mixture, achieve disruption of the outer scale layers, and prevent subcritical oxidation. For strip finished at 1500°F, the strip should be quenched to 700° to 750°F on the runout table before entering the coiler. This assures a fine dispersion of the proeutectoid Fe_3O_4 crystals. The range of temperature, 700° to 750°F, is specified for 2 to 4 ton coils whose heat-back upon coiling will elevate the temperature to 900° to 950°F (about 480°C).

The optimum amount and particle size of the eutectoid mixture will thus be assured, since isothermal treatment at the temperature of maximum rate of decomposition is simulated for the length of time indicated to be an optimum value. The coils should be permitted to air cool to 700°F and then should be water quenched to room temperature to prevent further oxidation and to achieve disruption of the outer scale layers. The oxide conditioning practice outlined for this type product in combination with improvements in pickling technique will, it is believed, assure optimum pickling rate.

References

[1] Based on research performed by C. B. Murton in partial fulfillment of the requirements for the degree of Bachelor of Science at Carnegie Institute of Technology.

[2] Pfeil, Journal Iron & Steel Inst., 123, 1931, p. 237.

[3] Winterbottom and Reed, Journal Iron & Steel Inst., 126, 1932, p. 159.

[4] Chaudron and Forestier, Comte Rendu, 1924, pt. 2, p. 1773.

[5] Warner, Metal Cleaning and Finishing, vol. 10, No. 2, February 1938.

Metal Show Highlights Industrial Progress

Metal Congress in Chicago highlights trend to working exhibits . . . Foley elected ASM president . . . Hill heads AWS . . . McCutcheon to lead nondestructive testing group . . . Technical papers cover wide range of subjects.

ANOTHER successful National Metal Congress and Exposition—the 29th—has come and gone. The many thousands in attendance at the technical sessions of the four participating societies were treated to a well-rounded program of timely and interesting subjects discussed by some of the most capable metallurgists in the country. The Exposition, with its some 400 exhibits, attained a new high in presenting new equipment and methods of metal production and fabrication. It appears that with each succeeding metal show, an increasing number of participants are turning to "live" exhibits, not only in the form of working models, shown going through the motions, but more so in the display of full size operating equipment.

Presentation of five awards highlighted the annual dinner program of the American Society for Metals, held at the Palmer House, Oct. 23. The Henry Marion Howe medal was awarded to W. A. Pennington, chief metallurgist, Carrier Corp., Syracuse, for the paper of highest merit published in the ASM Transactions during 1946. F. P. Zimmerli, of Barnes, Gibson, Raymond Co., received the Albert Sauveur Achievement award; C. H. Mathewson, professor of metallurgy, Yale University, received the ASM gold medal; C. R. Hook, of the American Rolling Mills Co., Middletown, Ohio, received the ASM medal for the advancement of research; and C. H. Herty, Jr., of the Bethlehem Steel Co., Bethlehem, Pa., was awarded the past president's medal. Mr. Herty was president of the society during 1946-47.

The dinner speaker, R. F. Bacher, professor of nuclear research at Cornell University and a member of the U. S. Atomic Energy Commission discussed the relationship between atomic energy and the metallurgist. He pointed out that with the advent of atomic power, the requirements put upon materials will be greater than ever, and that the development of suitable materials which will stand up to the conditions to which they are subjected at high temperature, has scarcely begun. In this work, he said, metallurgists must play a leading role if development is to be successful.

Members of the Society in attendance at the annual meeting, Oct. 22, cast a unanimous ballot

(CONTINUED ON PAGE 52)

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BELOW

THE Albert Sauveur Achievement Award went to F. P. Zimmerli (center) of the Barnes, Gibson, Raymond Co. At the left is W. E. Jominy of Chrysler Corp., and seated is W. Woodside, ASM past president and founder member.

SM president-elect F. B. Foley, of the Midvale Co., Philadelphia.

ABOVE

ASM president, A. L. Boegehold, General Motors Research Laboratories, Detroit, presents the past-president's medal to Charles H. Herty, Jr., of the Bethlehem Steel Co.

SM president A. L. Boegehold presents the ASM gold medal to C. H. Mathewson, professor of metallurgy, Yale University (center). anding at the right is A. E. White, professor of metallurgy, University of Michigan.

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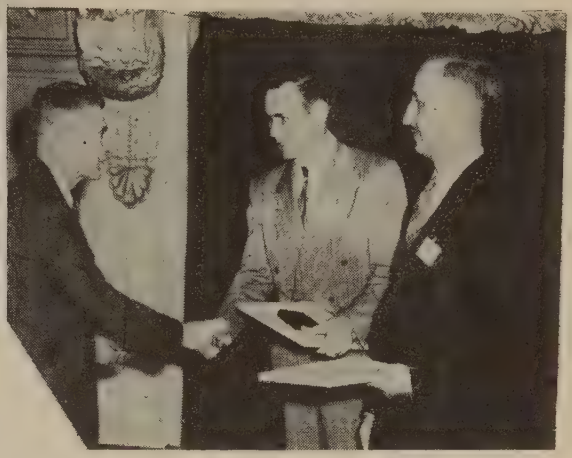
BELOW

W. A. PENNINGTON, of the Carrier Corp., Syracuse, is shown receiving the Marion Howe medal from ASM president A. L. Boegehold.

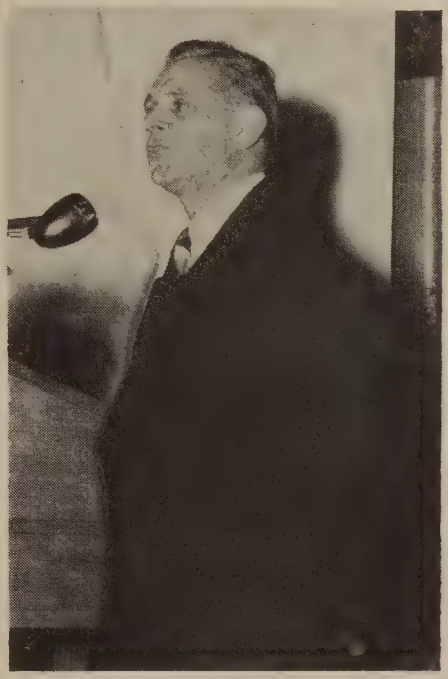
AT the American Welding Society meeting, Dr. A. B. Kinzel was awarded the Samuel Wylie Miller medal by Prof. G. E. Doan, Lehigh University.

H. O. HILL was elected president of the American Welding Socity for the year 1947-1948.



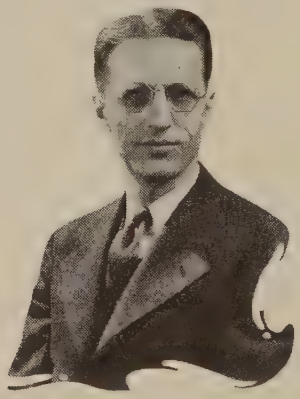
WINNERS of the Lincoln Gold Medal Award were R. J. Rieppel (center) and Manley W. Mallett (right) of Battelle Institute, Columbus. D. H. Corey, AWS director and welding engineer of Detroit Edison Co., made the presentation.

O. B. J. FRASER was elected AWS second vice-president.



ABOVE

THE 1947 Campbell Memorial Award lecturer, A. B. Kinzel, vice-president, Union Carbide and Carbon Research Lab. and Electro-Metallurgical Corp.



NEW president of the Society for Nondestructive Testing is Don McCutcheon, Ford Motor Co., Detroit.

G. S. MICKHALAPOV was the 1947 Adams Lecturer. He is manager of apparatus research for Air Reduction Sales, New York.

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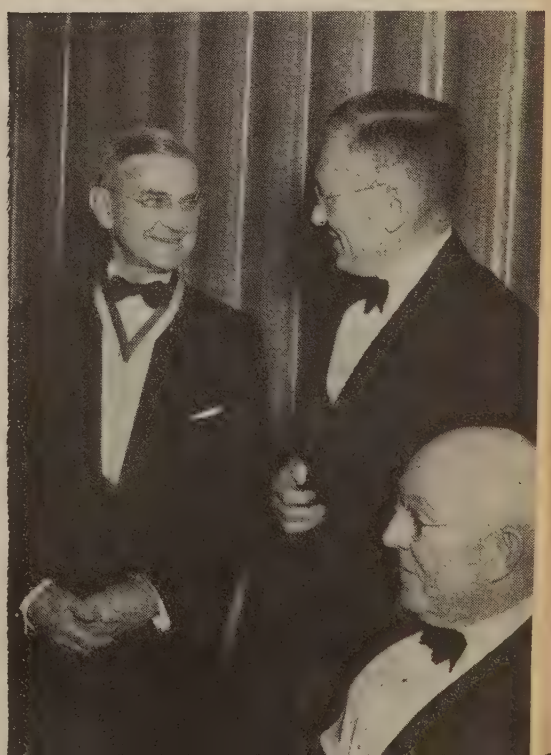
RIGHT

C. R. HOOK, American Rolling Mill Co., Middletown, Ohio, (left) received the ASM medal for the advancement of research. In the center is Prof. John Chipman of MIT and at the right is Mr. Woodside.



for the election of the following national officers: F. B. Foley of the Midvale Co., Philadelphia, president; H. K. Work, Jones & Laughlin Steel Corp., Pittsburgh, vice-president; E. L. Spanagel, Rochester Gas & Electric Corp., treasurer; and W. H. Eisenman, secretary. Two trustees also elected were: C. M. Carmichael, Shawinigan Chemicals, Ltd., Montreal; and E. G. Mahin of the University of Notre Dame.

Following the adjournment of the meeting, A. B. Kinzel, vice-president, Electro Metallurgical Co. and Union Carbide and Carbon Research Laboratories, Inc., New York, delivered the 1947 Edward De Mille Campbell Memorial Lecture. A condensed version of this lecture, entitled "Ductility of Steels for Welded Structures," is presented later in this report.

The American Welding Society, at its annual meeting, elected Harold O. Hill as its president for the year 1947-48, which office he assumed on Oct. 24. O. B. J. Fraser was elected second vice-president; Russell S. Donald, treasurer; and the following district vice-presidents were elected: G. M. Trefts, III, of Farrar & Trefts, Inc., Buffalo; R. E. Lorentz, Jr., Combustion Engineering Co., Inc., Chattanooga, Tenn.; J. R. Wirt, Delco-Remy Div. of General Motors Corp., Anderson, Ind.; and Gilbert S. Schaller, University of Washington, Seattle. Mr. Hill, the new president, is assistant chief engineer of fabricated steel construction for Bethlehem Steel Co. and a member of AWS for 16 years. Mr. Fraser, the new vice-president, is assistant manager of the development and research div., of International Nickel Co., New York.

Elected directors of AWS for 3-year terms were: David Arnott, consultant, American Bureau of Shipping, New York; Thomas M. Jackson, chief electrical and welding engineer, Sun Shipbuilding and Dry Dock Co., Chester, Pa.; C. I. MacGuffie, manager of sales, electric welding div., General Electric Co., Schenectady; and John B. Tinnon, vice-president, Metals & Thermit Corp., New York. Mr. Arnott is a past president of AWS and recipient of the Miller Medal in 1941 for his contributions in the field of marine welding.

Outstanding in the week long series of AWS activities was the award of the Adams lectureship to G.S.Mickhalapov, manager of the apparatus research dept., Air Reduction Sales, New York. He delivered the paper entitled "Structural Strength of the Welded Joint," at the annual meeting of the society, held Oct. 20.

Kinzel Delivers Miller Lecture

Dr. A. B. Kinzel, vice-president, Electro Metallurgical Co. and Union Carbide and Carbon Research Laboratories, received the Samuel Wylie Miller Memorial Medal, awarded annually for conspicuous contributions to the advancement of welding or cutting metals. The Lincoln Gold Medal Award went to Perry J. Rieppel and Manley W. Mallet of Battelle Institute for their paper entitled "Arc Atmospheres and Underbead Cracking."

"Some Metallurgical Aspects of Carbon Steel Spot Welding," won for Julius Hueschkel, of the Westinghouse Research Laboratories, the $750 first prize in the Resistance Welder Manufacturers' Assn. contest. The second prize of $500 went to D. Bruce Johnston, of McPhee & Johnston, New York. Third prize of $250 in this series went to Horace J. Grover and Lloyd R. Jackson, physicists at Battelle Institute, Columbus, for a paper entitled, "Fatigue Tests on Some Spot Welded Joints in Aluminum Alloy Sheet Material."

For the best paper from a university source, the Resistance Welder Manufacturers' Assn. award went to Wendell F. Hess, T. B. Cameron, F. J. Winsor and Dutton J. Ashcraft, all present or former members of the staff of Rensselaer Polytechnic Institute, Troy, New York. Dr. Hess is head of the Metallurgical Engineering Dept. at Rensselaer, past AWS president. Dr. Cameron is assistant professor of chemistry at the University of Cincinnati, and Dr. Winsor is a research metallurgist with the Armour Research Foundation, Chicago. Mr. Ashcraft is a junior engineer with the technical service division of Standard Oil Co. of Ohio, Cleveland. A paper entitled "Interpretation of Radiographs of Spot Welds in Alclad 24 S-T and 75 S-T Aluminum Alloys" was selected as the second best paper from a university source and its authors, Robert C. McMaster, research physicist, Battelle Institute; and F. C. Lindvall, professor of electrical and mechanical engineering, California Institute of Technology, Pasadena, Calif., were awarded the $200 prize.

John W. Price, Jr., a senior at Rose Polytechnic Institute, Terre Haute, Ind., and Howard Sanders, a 1947 chemical engineering graduate of Cornell, received first and second prize certificates and cash prizes of $200 and $150, respectively, in the A. F. Davis Undergraduate Welding Award program.

Government Research Expands

The theme of the AIME annual dinner, as expressed by Henry T. Heald, president, Illinois Institute of Technology, was the growing proportion of financial support contributed by government to basic and applied research in this country. With financial support goes increasing government control of research, which is undesirable, Dr. Heald said. Greater industry support of research would have a more wholesome effect on the country's research program, in Dr. Heald's opinion. The growing disparity between programs of applied and basic research was reported in dollar costs; the suggestion was made that the country would benefit by somewhat more basic research. The speaker also called attention to the long term shortage of skilled research persons, and suggested that this situation might be improved by a program of government financial backing for college education for exceptional students who might be expected to make a contribution to the country's welfare.

Other speakers at the dinner were H. W. Johnson, chairman, Chicago section, who welcomed members in a brief address. E. A. Anderson,

chairman, Institute of Metals Div., extended thanks of the membership.

In an atmosphere that emphasized the rapidly growing realization of the importance of nondestructive testing as an industrial development and production tool, the American Industrial Radium and X-Ray Society held its seventh annual meeting in conjunction with the National Metal Congress. In an effort to more adequately cover its aims and activities, it was decided at the annual meeting on Thursday to change the society's name to the "Society for Nondestructive Testing."

New officers of the society installed at the annual meeting included: president, Don M. McCutcheon, Ford Motor Co., Dearborn; vice-president, Dana W. Smith, Permanente Metals Corp., Spokane; treasurer, Leslie W. Ball, Naval Ordnance Laboratories, White Oak, Md. Phillip D. Johnson was re-elected secretary. New directors to take office this year were Noah Kahn, material laboratory, Brooklyn Navy Yard, and Justin G. Schneeman, X-Ray Products Corp., Los Angeles. This year's Lester lecture was delivered by Leslie W. Ball, Naval Ordnance Laboratory, White Oak, Md.

Space limitations prevent a discussion of all the papers presented at the various meetings, however abstracts of some of these papers are given in the following pages.

Campbell Memorial Lecture

Highlight of the ASM technical program was the Edward DeMille Campbell memorial lecture, delivered by A. B. Kinzel, vice-president, Electro Metallurgical Co. and Union Carbide & Carbon Research Laboratories, Inc., on the subject "Ductility of Steels for Welded Structures." Based on the premise that "the essence of the weldability problem is ductility of the weldment," the speaker offered a testing procedure to serve as a criterion of service performance.

A review of various testing methods and of results of several research programs was presented by the author, together with his viewpoints of the inadequacy of these methods and programs in arriving at the true measure of weldability. It appears that none of the present-day testing procedures incorporate all of the factors influencing hardenability. Kinzel observed that there is a general trend in weldability testing to the use of low temperatures as a determining variable, and all of the recent investigators consider that service performance of a steel or weldment is related to its transition temperature.

It was pointed out that in addition to loss of ductility due to mechanical defects, hardening, rate of loading, and restraint, loss of ductility due to lowered temperature of service must be considered. The steel may normally have a high transition temperature or it may be raised by some phenomena encountered in fabrication. Loss of ductility due to lowered temperature may well be critical in welded structures, and in many instances may be more important than any reduced ductility at room temperature. Broadly speaking, all of the factors which reduce ductility should be integrated in a manner analogous to their integration in service behavior, and it was the intent of the speaker to describe a test specimen and test procedure comprising such integration.

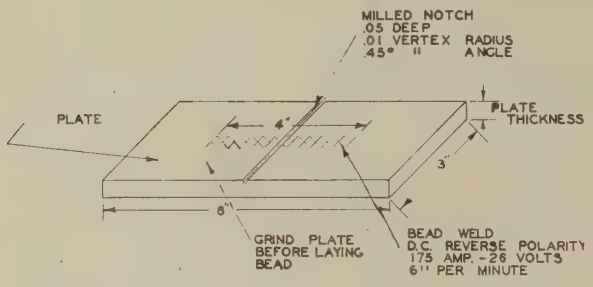
To integrate the more important of the factors affecting ductility, a specimen should involve actual welding. This will produce the heat cycle of concern, and power input, speed of welding, and mass of the specimen should be variable to match the application in question. If the thickness of the test specimen be the same as the thickness of the plate intended for the welding, mass effect is automatically matched. If the heat input and rate of deposition be selected to match, the most severe welding condition to be encountered in manufacture is duplicated. This much of the specimen and procedure can be readily standardized for the general case by the use of a single bead weld under prescribed conditions. By using a weld bead, all chemical and metallurgical effects, including the hydrogen effect, are reflected in the specimen.

The matter of embrittling temperature of the steel either as ready for welding or as affected by the heat of welding is the next factor to be considered. By using a specimen with a longitudinal bead and sufficient width so that material which has been unaffected by welding heat as well as that which has been subjected to hypercritical, subcritical, and all other temperatures down to atmospheric temperature, there is at once comprised in this specimen all of the zones of interest with respect to heat treatment. By notching the specimen at right angles to the weld, each of the zones is notched. As regards another item—the effect of strain aging—it is only necessary to strain the plate prior to deposition of the longitudinal bead. If this specimen be then tested in static loading as a beam simply loaded in the plane of the notch, one has a specimen comprising all notch-sensitive areas in the weldment and in which failure will be initiated by the most notch-sensitive area.

The one variable remaining as a determinant in matching the test to the service is temperature. In research work various temperatures might be used, but for routine testing and specification purposes a single temperature could be established for most weldments with the proviso that the failure be of ductile character when the specimen is tested at that temperature. This would give a simple "go—no-go" test. The matter of quantitatively specifying the character of the failure with respect to ductility is important, and was dealt with in detail by the speaker.

A true criterion of material behavior was ob-

tained by resorting to reasoning from service performances. Examination of service failures showed the glaring crystalline facets in the fracture, invariably at the origin and frequently throughout the whole fracture. However, it was found that when the crack has not gone through the entire structure, some fibrous areas appear at the edges near the end of the fracture. Whenever this occurs, there is a small but definite reduction in cross-section of the plate material. This contraction of cross-section at the point of failure offers an excellent index of performance. This eliminates yield strength as a direct factor in



SLOW BEND TEST PLATE - BEAD WELDED

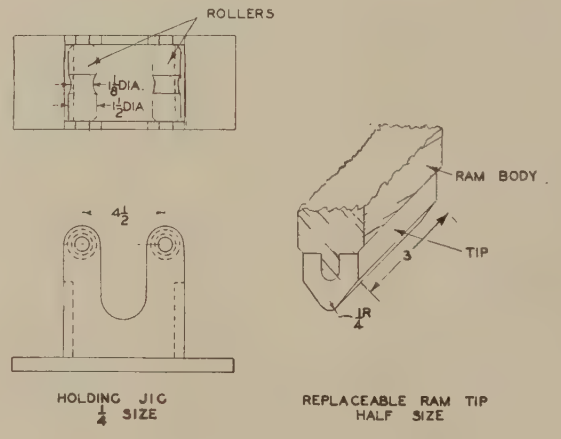
FIG. 1—The notched slow bend test specimen.

the index, reduces cold work effect to negligible proportion, and is separate from the rate of propagation. Accordingly, the width of the specimen adjacent to the notch was measured with a micrometer caliper. The linear contraction of the specimen could be readily measured 1/32 in. below the notch and in the zone immediately adjacent thereto. This has been termed "lateral contraction," and a number of steels were tested using lateral contraction as an index of performance.

The best definition of transition temperature appears to be that temperature at which the steel first fails with plastic deformation approaching zero, under a given set of conditions. For any given steel in a given stage of heat treatment, the transition temperature is a function of stress distribution and rate of loading. From an engineering standpoint, the interest is in that condition in the average structure which results in failure without warning, commonly known as brittle failure. The test specimen and procedure proposed take these factors into proper consideration. The sharp notch in a 3-in. wide specimen represents the worst probable stress distribution in such a structure. The rate of loading corresponding to the 1 ipm motion of the ram in testing is of the same order of magnitude as rate of application of loading stresses for structures in "static" service. Finally, a measured contraction of 1 pct under these conditions broadly corresponds to the deformation measured in service failures at the section near the end of cracks which stop propagating. Further, it was noted that the temperature corresponding to 1 pct lateral contraction of the test specimen is about the same as the "transition temperature" one would expect to find at low temperature under service conditions. It differs from any theoretical transition temperature in that there is a factor of safety comprising the difference between zero and 1 pct lateral contraction.

For clarity and for engineering purposes it was chosen to define that temperature at which the specimen in question shows no more and no less than 1 pct lateral contraction parallel to the notch as the embrittling temperature. This definition of embrittling temperature is based on engineering judgment by analogy with other indices for ductility. It should be emphasized that in all engineering design there is no absolute criterion for degree of ductility. All specification for ductility are of the same nature, arbitrary, even though resulting from considered judgment based on experience.

The proposed specimen and jig are shown in figs. 1 and 2, respectively. The notch, fig. 1, is located by indexing from the surface of the plate and cut with a fly cutter or a milling cutter, which should be checked at frequent intervals with a template gage. The thickness of the specimen should be the same as that of the plate. The only dimensions that must be accurate pertain to the notch. The width of the specimen need not be accurate, as shaping the edges adjacent to the notch provides parallel surfaces for direct measurement. A slight variation from the 3-in. width is of no consequence, since



SLOW BEND TEST

FIG. 2—Jig for slow bend test.

readings are taken before and after testing.

While the radius of the ram head, fig. 2, used in connection with the jig is given, this radius is not critical. The depression in the rollers to allow passage of the deposited bead can be varied without effect on the results. The distance between roller centers and the diameter of the rolls should be held to a reasonable tolerance, as these control the effective span of the specimen. However, this is not a critical factor in the results as far as minor changes are concerned.

The span used requires some discussion in that with constant speed of ram head the rate of

straining decreases as span increases. The pattern of stress distribution about the notch is probably changed only very slightly. A span of 4½ in. was selected on the basis of the results.

For all test temperatures down to −78°C (−108°F), the use of acetone-dry ice mixtures is convenient and effective, while from −78°C (−108°F) to −150°C (−238°F, a bath of petroleum ether cooled by liquid nitrogen circulating through a heat exchanger coil has been found to be most satisfactory. Below −150°C (−238°F), specific mixtures are used for specific temperatures, as follows: −183°C (−297°F), liquid oxygen; −196°C (−320°F), liquid nitrogen. For most routine testing there is little need to go below −40°C (−40°F), and the simple acetone-dry ice mixture is adequate.

Plate thickness is known to be of major importance in connection with performance due to quench effect, strain effect, and segregation, commonly known as banding. These factors may all be comprised in the test in that the thickness of the plate tested can and should be the same as the thickness of the plate intended for service. Moreover, as long as lateral contraction is used as the criterion for embrittlement, it is not necessary to change any other condition such as span or the temperature of test when dealing with plates of different thicknesses. The results will be different, as they should be in line with the thickness under consideration. The thicker plate on the same span will exhibit higher embrittling temperature.

The test uses a speed of loading corresponding to ram motion of 1 ipm, and this is apparently sufficient for "static" structures. However, should greater rates of loading be expected in service, the rate of movement of the ram may be changed accordingly without changing any other items in the specification of the test, thus taking the rate of loading in anticipated service into account.

Obviously, the notch may be sharpened to increase restraint for materials going into structures having unusually high restraint. However, this may be accomplished by specifying a lower temperature of embrittlement, and this is suggested because changing the notch also affects the stress pattern and the rate of loading in a way that would be difficult to establish quantitatively.

Only a single test temperature need be used. This test temperature is a matter of engineering judgment, and should be related to the intended service. For structures intended for indoor service without low temperature contents, −20°C (−4°F) appears to be consistent with other criteria applied in the past as well as general engineering experience. For general outdoor service within the confines of the U. S., −40°C (−40°F) appears to be a test temperature which would insure safe performance.

Hardenability of Boron Steels

An investigation made for the purpose of determining the predominant factors influencing the hardenability of boron steels was reported by G. D. Rahrer, staff metallurgist, metallurgical division, Alloy Unit, Western Area, and C. D. Armstrong, metallurgist, research laboratory, Gary Steel Works, Carnegie-Illinois Steel Corp., in their paper entitled "The Effect of Carbon Content on the Hardenability of Boron Steels."

The samples on which the authors' data are based were obtained from commercial openhearth heats, the total ingot weight of each heat ranging from 15 to 180 tons. Boron additions were made either to the ladle after other additions, or to the ingot during teeming. For comparison with each boron steel sample, another without boron of approximately the same chemical composition was obtained.

The hardenability factors for boron were determined essentially from the ratio of the D_I (derived from end-quench test) of a boron steel to the D_I of the companion boron-free steel. From the end-quench test values, two values of D_I were determined for each steel; one on the basis of Jominy distance to 50 pct martensite, and the other to 90 pct martensite.

Results indicated that the hardenability factor for boron in any one sample is approximately the same, whether calculated from D_I values based on 50 pct martensite or based on 90 pct martensite.

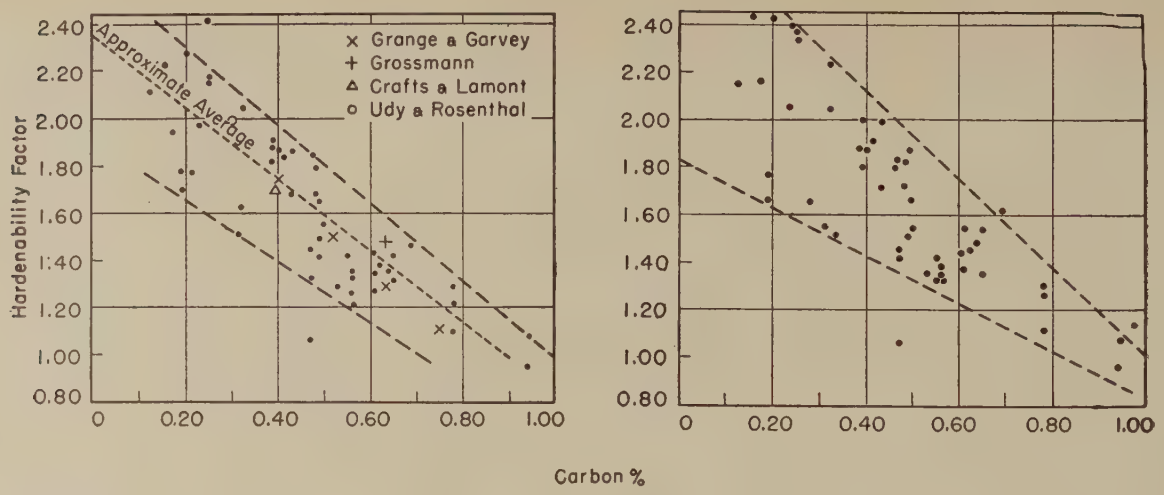
The effect of boron on the hardenability values of the samples examined is shown graphically in the accompanying figure. Values found by other investigators are also plotted. The average effect of boron on hardenability was said to be slightly less in the commercial heats considered by the authors than found by previous investigators, since more values are lower than a curve indicating their average results. Results of this investigation agree in that the effect of boron becomes negligible at about eutectoid composition.

The factor for boron in the calculation of hardenability as affected by carbon content can be expressed approximately by the formula:

$$F_B = 1 + 1.5\ (0.90 - C)$$

where F_B is the hardenability factor for boron and C is percent carbon. This assumes a value for F_B of 1.00 at 0.90 pct carbon and of 1.90 at 0.30 pct carbon. This variation of the multiplying factor for boron with carbon content is shown in the figure as an approximate average, the authors believing that the assumption of a straight-line graphical expression of the relation between F_B and C yields a result sufficiently accurate for practical purposes.

A study of the effect of the amount of alumi-



EFFECT of carbon content on the hardenability factor of boron, based on ideal critical diameter derived from (left) 50 pct martensite, and (right) 90 pct martensite critical hardness.

num added indicated no apparent correlation with the influence of boron, although it was determined that adequate deoxidation with aluminum or other strong deoxidizers prior to or accompanying the addition of boron is required, in order to realize the potential increase in hardenability from boron.

Using the above formula, the combined effect of carbon and boron at various carbon contents was calculated by multiplying the boron factor by the factor for carbon, assuming a grain size of 7. The two sets of calculations made, based on the factors for carbon derived by Grossmann and by Kramer, et al, indicated that the greatest depth to a certain percent of martensite would be achieved in boron steels at 0.40 to 0.60 pct carbon with other alloying elements constant. It appears, however, that the hardenability of boron steels varies to an unexpectedly small degree with carbon content in contrast to the marked effect of carbon content on the hardenability of boron-free steels.

Long Term Ship Studies Reported at Welding Meetings

Results of work done in the past 5 years on welded ship construction were summarized in a series of papers that dealt with various phases of this subject. Starting back in 1943 after various ships, particularly those of a cargo variety, opened up at or near welded joints, investigations have been proceeding on this subject. The papers presented at the American Welding Society meetings during the National Metal Congress pertaining to ship construction dealt with practically all phases of welded construction from the very practical to the highly theoretical. Some studies are still being carried on today under a Ships Structure Committee, consisting in membership of men who had participated on the Navy appointed Board to Investivate Design and Construction Methods of Welded Steel Merchant Vessels, a group that was officially terminated.

Rear Admiral Ellis Reed-Hill, chairman of the Ship Structure Committee, indicated that three years of investigation by the old Board had yielded valuable information on: (1) residual stresses in ship welding; (2) evaluation of factors affecting crack sensitivity of welded joints; (3) behavior of steel under multi-axial stresses; (4) cleavage fracture of ship steel as influenced by size effect, design and metallurgical factors; (5) correlation of laboratory tests with full scale plate fracture tests and (6) fatigue tests of ship welds.

While some of these studies are still being carried on by the committee, new studies have been initiated to investigate the effect of welding on structural performance. Some of these contemplated studies are on such subjects as, riveted v. welded structures, strains in ships at sea, structural tests of ships, and cracking and distortion.

It is intended that the work done to date on welded ship construction will be continued under the new committee, which is maintaining close liaison with the Welding Research Council, the American Iron & Steel Institute, the Society of Naval Architects and Marine Engineers, and other such agencies interested in welding, steel, and shipbuilding. Because of the importance of the work being done by this committee, it is impossible to choose any particular paper presented at AWS as the one outstanding paper. As a matter of fact, the activities of the participants in this program are closely allied and correlated, so much so that frequently the full comprehension of one phase of the work is difficult without studying other phases of activity in this study of welded ship construction.

The papers presented included studies on

Table I—Welding Conditions for Sheets 0.1575-in. Thick

Thickness of sheets	0.1575 in.
Width of sheets	3.94 in.
Welding surface	0.62 sq. in.
Height of burner above sheets	0.303 in.
Distance between sheets	0.079 in.
Upsetting pressure	4522 psi
Duration of heating	5.25 sec
Oxygen and acetylene pressure at equalizer	3.1 psi
Oxygen and acetylene flow	90 cu ft per hr

Table II—Welding Conditions for Dissimilar Thicknesses (0.039 and 0.103-in. Thick)

Thickness of sheets	0.039 and 0.103 in.
Width of sheets	19.69 in.
Height of burner above sheets	0.236 in.
Distance between sheets	0.138 in.
Distance of axis of flames:	
from 3-mm. sheet	0.276 in.
from 1-mm. sheet	0.110 in.
Upsetting pressure	1849 psi
Duration of heating	6 sec
Oxygen and acetylene pressure at equalizer	3.6 psi
Oxygen and acetylene flow	706.2 cu ft per hr
Cooling water flow	79.3 gal per hr

causes of fracture in ship plate, investigations of steels removed from fractured ships, tests of different welded hatch corner designs, correlations of laboratory and full scale fracture tests, and the development of a technique for evaluating transition from shear to cleavage failure in ship plate.

Open Joint Fusion Welding

A phase of welding technique not in general use was described in a paper by N. H. Cuke of Canadian Liquid Air Co., Ltd., Montreal, when he discussed "Multiple Flame Pressure Welding." His paper dealt with open joint fusion pressure welding, wherein the parts to be welded are held a short distance apart during heating, and brought together under sufficient pressure to cause an upsetting of the metal in the weld zone. Since the weld faces are brought to the melting temperature before pressure is applied, the bond is, at least in part, a fusion weld. This of course differs from the generally used buttwelding technique in that in the latter the weld faces are heated to a temperature just below the melting point and the process is in reality a solid phase weld.

A typical example of the fusion pressure welding process setup is illustrated in fig. 1, showing the burner position about the plates to be welded, the direction of upsetting pressure, the water inlets and outlets, and the gas inlets and ports.

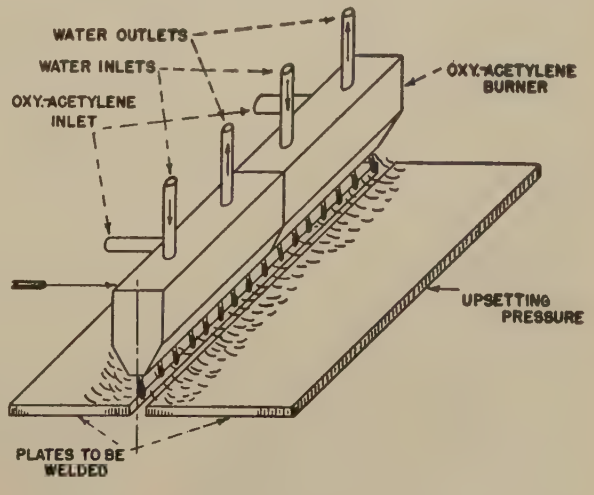
The paper describes the heating technique along with the preparation of weld faces, flame characteristics, weld appearance, weld component positioning, process control, gas pressure regulation, and then describes a series of tests made on low carbon steel plates. The multiple-flamed oxyacetylene burner is suspended between and above the weld faces and is oscillated back and forth along the line of the weld in order to obtain even heating. Weld face preparation is important in solid phase welding, but in the technique described by Cuke the faces need not be too carefully prepared. Shearing produces satisfactory surfaces for good welding because the minute voids and rough spots are eliminated when the surfaces melt. Freedom from scale or rust is important on the weld faces, however, to limit the amount of oxide inclusions in the weld.

The duration of heating is short, usually 5 to 10 sec, but control is important. If pressure is applied too soon, there is insufficient fusion at the weld faces and the plastic zone is not deep enough to produce a good weld. If pressure is applied too late, the molten metal begins to drip, the upsetting is spongy and porous, and the weld is poor. While timing is important, there is a sufficient time range that the process can be controlled manually by a good operator. For production setups, however, automatic timing is advisable.

The chief problems of this technique have been to get a burner design that keeps all flames balanced, and to keep the gases supplied to the burner at a constant pressure or flow. The former problem is one of design. The latter has been solved by the development by Canadian Liquid Air Co., Ltd., of a "pressure equalizer" that will deliver both the oxygen and the acetylene to the mixing chamber of the torch at equal pressures to a high degree of accuracy. The delivery pressure of the equalizer may be set to any desired value, and a flowmeter, installed in the oxygen line between the equalizer and the torch, gives an accurate reading of the pressure.

In the tests made on low carbon steel plates 0.1575 in. thick by 3.94 in. wide, results were said to be highly successful. The burner construction used in this series of tests is shown in fig. 2, and table I gives the welding conditions finally arrived at during the tests. These conditions were arrived at after numerous tests and

FIG. 1—Sketch of arrangement for fusion pressure welding.



were only considered ideal or final after 15 consecutive perfect welds were made. Physical testing of the welded section did not consist of tensile or elongation tests because the tests were conducted with a practical commercial application in mind—the joining of strip ends before cold rolling. Therefore, physical testing was limited to behavior of the welds under cold rolling. The upsetting on both sides of the sheets was removed by grinding, bringing the thickness

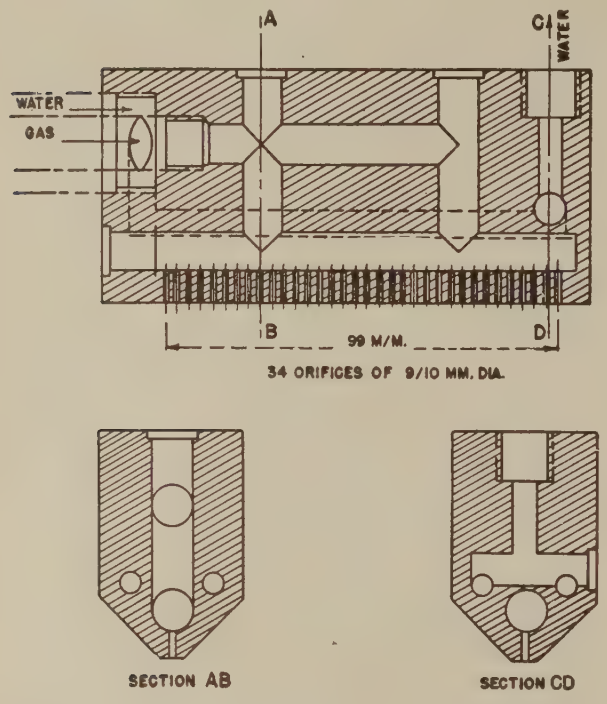


FIG. 2—Sketch of burner for fusion pressure welding plates.

of the weld zone down to the original plate thickness. These plates were then cold reduced in four passes from 0.1575 in. to 0.047 in. without heat treatment and in the as welded condition. None of the 15 test pieces broke or showed any signs of cracks or failure. After cold rolling and without annealing, the test pieces were subjected to bend tests. The angle at which cracking first appeared was less in some of the samples bent at the weld line than those bent in the base metal, but on the whole the results were too erratic to draw any definite conclusions.

Tests were run on other sheets of various thicknesses and on sheets of dissimilar thicknesses. Gas flow of the burner, it was found, must be adapted to the thicknesses of the pieces being welded. It was found that the duration of heating could be varied over an appreciable range.

Of some interest was the series of tests for a large automobile company of welding sheets of different thicknesses, one 0.103 in. thick and the other 0.039 in. thick. Welding conditions for this particular series of tests are shown in table II.

In this type of welding, the weld is free of a zone of oxidation because the weld faces are in a protective reducing atmosphere. Visual inspection is possible because, if the weld looks good, fusion has taken place since the operator can see the weld faces melting. Weld faces can be heated evenly since they are heated mainly by direct radiation and convection from the flames. There is no temperature gradient to speak of on the weld faces. Good welds can be made in light sheets or thin walled tubing and sheets or plates of dissimilar thicknesses can be welded.

Resistance Welder Control Developments

At an "Engineering Symposium of Future Control of Resistance Welding Equipment," lead by C. E. Smith, chief electrical engineer of Taylor-Winfield Corp., Warren, Ohio, some needed future developments in resistance welder controls were analyzed. He indicated that the synchronous control, which is the accepted precision timer, should have considerably fewer components and tubes because of the work of design engineers to improve the circuit to a more understandable type of electrical equipment that can be maintained and analyzed by the type of personnel available at this time. New designs will likely give consideration to the facility of adding voltage compensators or current regulators, without completely redesigning the circuit or breaking into any leads for external connections between the two units. The ignitron contactor associated with this type of panel and with the nonsynchronous type of equipment should be improved. Work should go ahead on improvement of the ignitron igniters and ignition characteristics to eliminate the necessary additional expense of loading resistors to produce consistent firing of the ignitrons with primary currents of 40 amp or less. There is also a real need for a small synchronous bench welding control, the present control being too expensive.

Present-day voltage compensators are too complicated both in installation and maintenance, it was stressed. Current regulators available are likewise too complicated from a circuit standpoint, which has a multitude of tubes requiring a design engineer or an experienced electronic engineer to service and maintain. The setup time during installation is high, and the speed of correction for any instantaneous current variation limits its application, especially in seam welders.

The author also discussed impending and possible developments in power factor rectifiers. Summing up the symposium, it appeared that the ac single-phase machine is still the best equipment for general purpose resistance welding and average installation. Improvements should be made on the electronic control panels to eliminate the heavy usage of relays and lower the tube complement. Voltage compensators and current regulators are too complicated and will not fit the full range of application. The dc welders, like the dry disk rectifier schemes and frequency converters, are good for lowering the kva demand and placing the demand on the three-phases.

The rate of rise of current and the resistance-conscious characteristics of these machines may be detrimental on certain types of material in comparison with ac welders. However, when consideration is given to the lowering of the primary kva demand and that they are 3-phase machines, it appears that in the immediate future considerable numbers of the 3-phase devices will gain in popularity in the heavy-duty machine applications.

Semikilled Steel Ingot Structure

The growing use of semikilled steels for applications whose requirements would normally call for a fully-killed steel lends major importance to a study of the "Structure, Segregation and Solidification of Semikilled Steel Ingots" by Michael Tenenbaum, Inland Steel Co., to develop further information on openhearth practice and ingot structure that affect the performance of steel in rolling and fabricating operations.

Semikilled steels included in the study involve the entire range between rimmed and fully-killed steel. Specifically, it is a study of: (1) Capped semikilled steel, in which aluminum is added near the end of the pour or after shut-off; (2) intermediate semikilled steel, in which aluminum is fed uniformly throughout the pour; and (3) semikilled steel requiring no mold deoxidation. To cover a full range of practice, three series of experimental heats were made using increasing amounts of aluminum, silicon and titanium for ladle deoxidizers.

Ingot structure studies were made by two methods. Ingots, after production, were burned longitudinally and machined to permit observation of central pipe and coarse blowholes. Since machining obliterated much of the finely porous subsurface structure, observations were also made on smaller sections burned from the outer edges of the same split ingots. These were machined, polished and etched to bring out the subsurface structure. Observations were also made of deep etched slab sections from all experimental heats. Split ingot faces were drilled for samples for chemical analysis from which macro segregation studies were made. Before drilling, sulfur prints were made of each typical ingot structure.

By regulating ladle and mold deoxidation, ingots were produced whose tendency toward gas formation ranged from a weak rimming action to a completely dead appearance. Throughout this range the observed features of gas formation could be interpreted according to known equilibrium relationships between the specific deoxidizing element used, the carbon and oxygen contents and the pressures existing within the ingot.

Pipe and subsurface blowholes were primarily affected by the manner and extent of ladle and mold deoxidation. Increased ladle deoxidation reduced the tendency toward gas formation, thus reducing the extent of subsurface blowholes and increasing the tendency toward pipe.

In mold deoxidation, the timing of the addition was as important as its amount. The feeding of aluminum throughout the pour affected ingot structure much in the same manner as ladle deoxidation, an increase in the amount of the addition reducing the tendency toward gas formation. Capping with aluminum while a stream of metal is still entering the mold both deoxidized the liquid metal in the body of an ingot and provided a cap to suppress gas evolution. Thus excessive capping additions made before shut-off were shown to result in heavily piped structure on ingots which also had definite subsurface blowhole zones. On almost all types of semikilled steel, close control of mold deoxidation was a prime requisite for satisfactory ingot structure.

Many features of gas formation in capped semikilled steel ingots have been observed in varying degree in sluggish rimming steels. The rim that forms in capped steels is negatively segregated while positive segregate tends to accumulate just within this zone. The location, extent and type of subsurface blowholes vary both with change in deoxidation and ingot height. Solidification of the negatively segregated rim of capped steels differs from rimming steels in that a much greater proportion of the gas formed beyond the skin zone is retained in the form of subsurface blowholes.

In the experimental ingots, maximum positive segregation occurred in the top central position. The exact level at which maximum segregation occurred varied from 60 to 78 pct of the nominal ingot height, this position being highest in ingots with the smallest shrinkage cavity. There was very little positive segregation in the central zone above the position of maximum segregation.

In practically all experimental ingots, the existence of central blowholes was limited to the top part of the ingot. These central blowholes were usually elongated in the freezing direction; that is, they were directed from the surface nad sides of the ingot toward the position of maximum segregation, indicating that the blowholes formed fairly continuously along with the wall of metal freezing in toward the center from the top and sides of the ingot.

All heavily piped ingots made in this study showed bridging. The bridges were essentially free from any heavy positive segregate. Also associated with the large pipe in several of the ingots were narrow negative segregate bands that extended vertically from the edge of the cavity down to the inverted vee lines. A general mechanism was suggested that might explain the existence of such negative segregate bands.

In most ingots, the inverted vee segregate lines were relatively straight and continuous and occurred in the same general position. It appeared that the inverted vee segregate line represented the junction between the outer wall of metal

freezing in from the ingot surface and the interior zone that solidifies through a process involving the formation, settling and accumulation of free crystals.

The experimental ingots of the investigation covered a relatively narrow analysis range. In addition, a single mold size and pouring practice were used.

In the discussion that followed, several speakers expressed concern over the possibility of the limitation of semikilled steel ingot yield which might grow out of the facts developed by this research on ingot structure and the mechanisms of segregation and solidification. However, it was generally agreed that the resultant improved quality of semikilled steels was equally as important to the consumer as the low cost represented by an improvement in ingot yield.

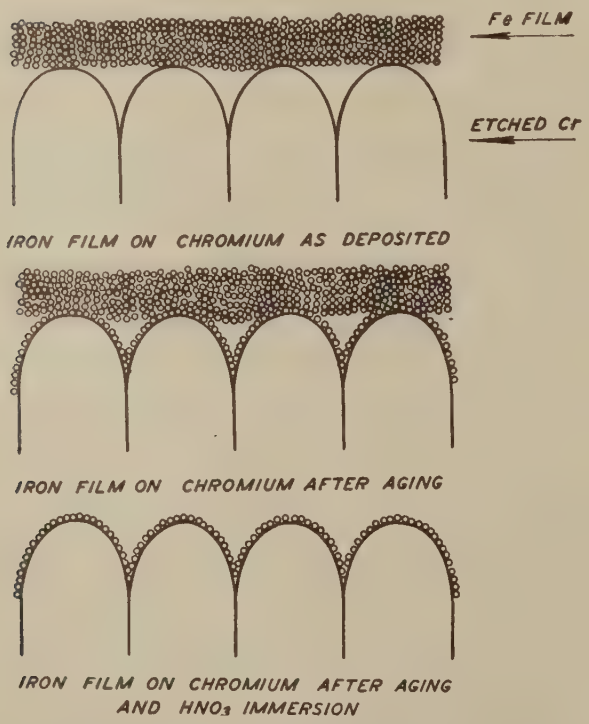
The problem presented to producers was whether it was better practice to deoxidize so as to obtain a large pipe cavity coupled with insignificant subsurface blowholes, or a small pipe cavity coupled with large and numerous subsurface blowholes. Other speakers, however, pointed to the partial or complete welding of the subsurface blowholes in the deep etched sections of slabs rolled from identically treated adjacent ingots from each heat.

The successful results of a series of heats where just enough deoxidizer was added to the ladle so that mold additions would not be required encouraged some speakers to question the advisability of omitting any mold deoxidation. It was generally agreed that some mold additions were necessary for control.

Passivity of Stainless Steels

AN important contribution to the phenomenon of passivity in chromium-iron alloys was made in a research study on "Passivity in Chromium-Iron Alloys; Adsorbed Iron Films on Chromium" by Dr. Herbert H. Uhlig, associate professor of metallurgy, Massachusetts Institute of Technology, and formerly at the research laboratory of General Electric Co.

The study indicates that chromium, by sharing electrons with iron in contact with it, can impart to iron the property possessed by chromium itself of chemisorbing oxygen or other elements and compounds. One result of such chemisorption, with its satisfaction of residual valences, is a sharp reduction of metal-surface reactivity.


Fe FILM
ETCHED Cr
IRON FILM ON CHROMIUM AS DEPOSITED
IRON FILM ON CHROMIUM AFTER AGING
IRON FILM ON CHROMIUM AFTER AGING AND HNO_3 IMMERSION

IDEALIZED sketch showing dispersion monolayer of iron on chromium after aging which is not dissolved by a subsequent nitric acid treatment.

There is evidence, therefore, that chromium, or stainless steels, or iron adsorbed on chromium derives its passivity from the same source as tungsten, the surface of which is covered with adsorbed oxygen, in accordance with the interpretation given by Langmuir to the results of his experiments in this field.

Dr. Uhlig's study poses the possibility that the mechanisms of surface diffusion and electron interaction which are supported by his results may account for the practical protection afforded by a very thin coating of chromium over nickel. Chromium coatings are very porous, but if the nickel or the chromium diffuses so as to insure intimate contact wherever nickel is exposed, there then exists a passive layer of nickel at all portions of the nickel surface even though the bulk of chromium may make contact at local areas only. The satisfactory protection of a commercial chromium coating no more than 0.00001 to 0.00002 in. thick on nickel-plated metal structures constitutes evidence that some such mechanism is probably operating.

The observed surface migration of iron on chromium at room temperature suggests one reason why metal coatings can be satisfactorily protective despite their evident porosity. It appears that the base metal becomes covered with a monolayer or more of the protecting metal, as shown in the accompanying illustration, whether or not pores in the coating reach to the surface of the base metal. Because of electron interaction with the base metal, the metal monolayer probably exhibits considerably more protection than its thickness or chemical properties suggest.

That iron brought into contact with chromium is passive at the interface was demonstrated by electroplating or evaporating iron on a chromium surface and immersing in 3N HNO_3. A residual film of iron always remained on the chromium surface. The amount of residual iron resistant to nitric acid was determined by treating the chromium surface with 1.5N HCl and analyzing for dissolved iron using the spectrophotometer.

Iron apparently adsorbs on the surface of

chromium in a manner similar to adsorption of alkali metals on tungsten, and the chemical properties of the adsorbed iron are changed causing it to behave as a passive metal.

These results lend weight to the electron configuration theory of passivity predicting such an effect. According to this viewpoint, electron interaction between alloyed chromium and iron in stainless steels imparts to iron the passive properties of chromium at a critical minimum alloy concentration (12 to 15 pct Cr) thereby accounting for pronounced passivity in these alloys. Consequently, electron interaction of the same kind is expected in at least superficial layers when iron is brought into physical contact with a chromium surface.

The amount of residual iron found on chromium was found to increase with the time elapsed between deposition of iron and reaction with nitric acid. Study of this effect shows that surface migration of iron occurs starting from local points of attachment and proceeds to all recesses of the chromium surface. Values of the true surface area of etched chromium combined with quantitative determinations of residual iron indicate that at least a monolayer of iron is passivated by contact with chromium. The data are not sufficiently precise to rule out formation of passive multilayers.

In the subsequent discussion it became evident that neither Dr. Uhlig nor some speakers were convinced of the probability that the electron interaction theory alone might account for all corrosion protection phenomena resulting from surface films.

Role of Nondestructive Testing Stressed

ONE of the highlights of the seventh annual meeting of the Society for Nondestructive Testing (formerly the American Industrial Radium and X-Ray Society) held last week concurrently with the National Metal Congress, was the Lester lecture. Delivered this year by Leslie W. Ball, director of the testing section, Naval Ordnance Laboratory, White Oak, Md., the Lester lecture was entitled "Nondestructive Testing in the Design, Manufacture and Evaluation of Naval Ordnance." This year's lecturer had the pleasant experience of being introduced by Dr. H. H. Lester himself, for whom the lecture was named. Dr. Lester, a pioneer in the field of industrial radiography, is senior physicist at Watertown Arsenal.

The lecture itself dealt with the important role played by nondestructive methods of testing in the development and production control of naval ordnance. As Dr. Ball pointed out, the use of nondestructive test methods is imperative to assure safety in making and using the destructive weapons of warfare. In addition to covering the use of such testing methods as radiography and magnetic particle inspection, the lecturer also discussed the development of laboratory conditions that would simulate field conditions in order to permit more effective, and often less expensive, evaluation of equipment.

One of the points particularly stressed by Dr. Ball was the outstanding need of developing engineers trained in an independent attitude toward evaluation of equipment.

Other papers presented at the three-day meeting were devoted to correlating and appraising techniques and materials used for nondestructive testing. Too, many of the papers were directed toward illustrating the manner in which radiographic inspection methods can be directed toward the solution of practical production problems, in addition to being used as an inspection tool. Typical of this latter effort, was a paper by C. G. Lutts, Boston Naval Shipyard, entitled "Skin Thickness in Bronze Castings as Shown by X-Ray of Thin Sections."

This paper described how radiographic methods were used to eliminate an excessive number of leakers in some bronze castings used in high pressure work. Based on the assumption that the leaking was associated with the existence of a skin on the surface of the part, thin slices (about ¼-in. thick) of a cross-section were cut out and studied at 220 kv. The resulting xographs clearly show the thickness of the skin and variations in this thickness and thus enable the machine shop to take cuts which would not completely remove the skin. The paper also described the use of this thin slice technique in a study of the effect of temperature on the skin of ingots. While the ensuing discussion developed the point that the proper remedy was perhaps more a metallurgical problem than a machine shop problem, nevertheless the paper did emphasize the effectiveness of the thin slice technique in studying skin conditions in bronze castings.

The use of isotopes in industrial radiography was discussed in another paper read by G. H. Tenny, of the Los Alamos Laboratories. Dr. Tenny described the development of radioactive isotopes and suggested many ways in which they could be used in industrial research and development. He indicated that in his opinion it was possible that for some industrial uses, under certain conditions, the use of these isotopes might prove superior to other methods.

A paper by D. M. McCutcheon and Merle F. Valade, Ford Motor Co., Dearborn, entitled "Polaroid Vectograph Technique Applied to Stero-Microradiography," described a method of making a viewable stero—a unit print incorporating both left and right images. The paper, which was read by Mr. McCutcheon, also gave a considerable amount of the formulation involved in determining total X-ray tube shift in producing the stero images. Other papers presented at the technical sessions covered such subjects as instruments for radiation measurement, automatic processing of X-ray film, reflected beam technique in million-volt radiography, the application of radiography to die casting, and the use of the 20-million volt betatron and the Van DeGraaff 2-million volt machine.

The Cold Strip Y-Mill

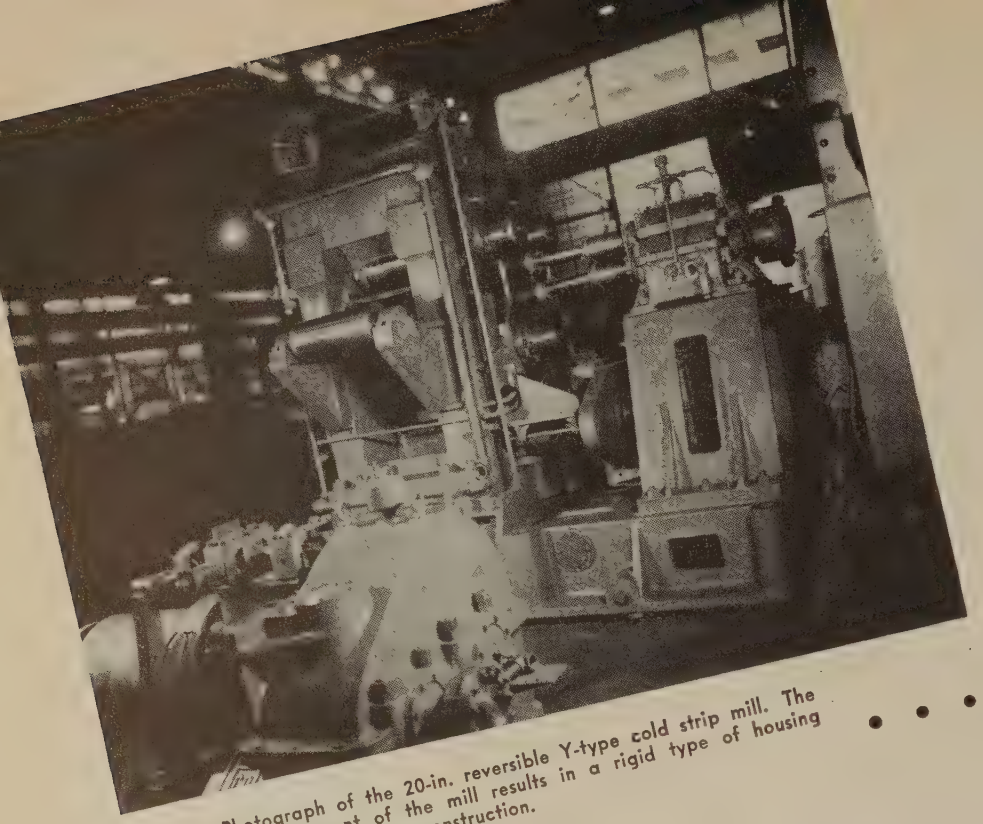


FIG. 1—Photograph of the 20-in. reversible Y-type cold strip mill. The compact arrangement of the mill results in a rigid type of housing construction.

A NEW type rolling mill, called a Y-mill, which is said to permit rolling of very thin strip as well as heavier gages in both low and high carbon and stainless steels, was described at the annual meeting of the Assn. of Iron & Steel Engineers held recently in Pittsburgh. The rolls of this new mill are in the form of a Y-shaped cluster.

The description of the mill was given in a paper by W. M. McConnell, chief engineer, Mackintosh-Hemphill Co., and A. B. Montgomery, consulting engineering, Pittsburgh. The unit was developed by Montgomery and built by Mackintosh-Hemphill.

The compact arrangement of the Montgomery mill, see figs. 1 and 2, results in the most rigid type of housing construction. Due to the fact that the housing windows are very short, and the roll pressure light, there is practically no stretch in the housing when taking maximum reductions. The fundamental design of the cluster part of the mill is to provide means for maintaining an approximate 90° angle from the center of the small friction driven baby or top work roll through the axles of the intermediate back-up or driven rolls and the large main top back-up rolls. This arrangement is maintained by shims under the top back-up roll chocks, the shims being used to compensate for roll grinding and for maintaining correct alignment, of the top roll assembly. The required thickness of shims is read directly from a gage that measures the distance between the top intermediate back-up rolls, in relation to their diameter and that of the baby roll. The 90° angle between the rolls in this part of the mill is essential to good operation. The setup of the upper group of rolls is easily obtained and can be held to a variation 0.0005 in. from end to end of the rolls.

The rolls in the Montgomery mill are arranged in the form of the letter *Y*, as indicated in fig. 3.

Beneath the strip, a 6¼-in. max diam work roll is supported along its body length by a 19½-in. diam back-up roll. These two lower rolls are carried on housing screws and may be adjusted up or down in the housing to suit strip thickness.

Above the strip, and directly over the lower work roll, is a V-shaped group of five rolls. The bottom roll in this formation is a 3¼-in. max diam baby work roll. Contacting this small roll on each side, at 45° from the vertical and forming the legs of the *V*, are two intermediate 6¼-in. diam rolls, each of which is supported by its own 17¾-in. diam back-up roll.

Each upper back-up roll is clamped in place at the top of its housing window, with a self-aligning rocker plate, to provide protection for the roll neck bearings against roll deflection. The two upper intermediate rolls and baby roll are balanced by springs or hydraulic cylinders, mounted in the lower work roll chocks to maintain roll contact between all the rolls when idling the mill.

The 6¼-in. diam lower work roll and the two 6¼-in. diam upper intermediate rolls are driven through spindles from the mill pinion stand. The diameters of the three driven rolls are matched to the normal variation in diameter allowable in four-high mills. The baby work roll and the back-up rolls are not driven. The mill can be arranged with the driven rolls from 5¾ to 7¼ in. and the baby roll from 2⅝ to 4 in.

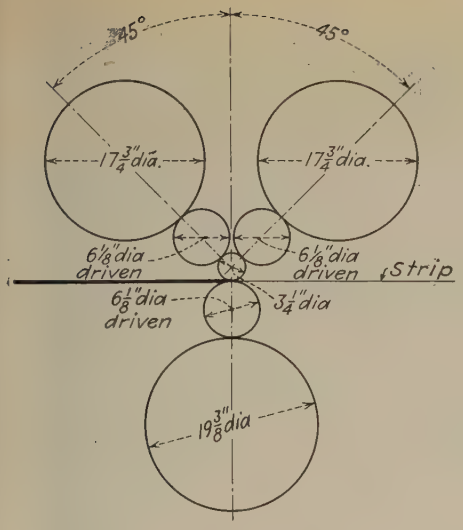


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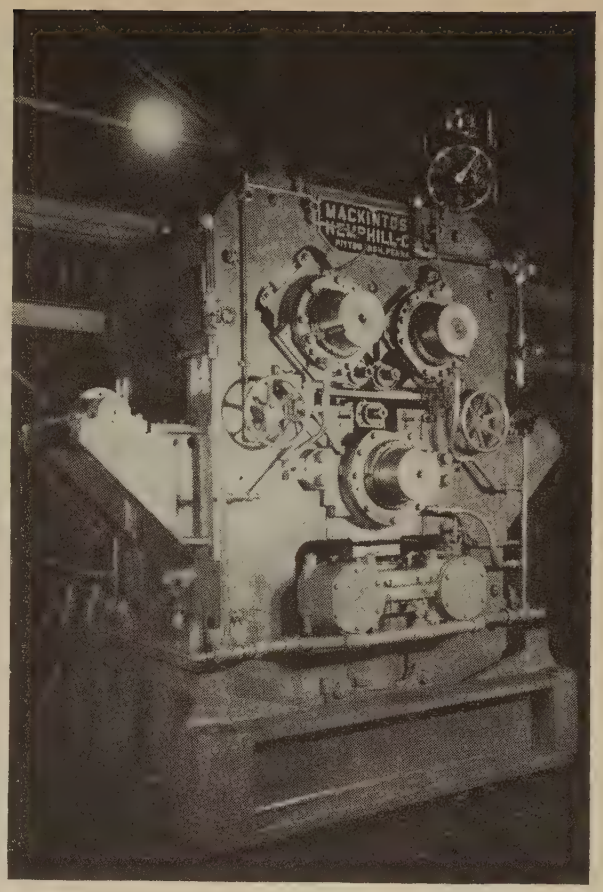
FIG. 2—A side view of the Y-type cold mill illustrating the arrangement of the rolls. The mill is said to be applicable to both high and low carbon steels and stainless steel for cold reduction and temper rolling.

o o o

LEFT

FIG. 3—Schematic diagram outlining the dimensions of the rolls and the working arrangement.



The lower work roll and the back-up roll are adjusted up and down on nonrotating housing screws, mounted in the lower part of the housing windows. All screwdown parts are designed so that the rolls may be forced into the strip. A single 5-hp motor, with reduction gears, furnishes power through gear type mechanical clutch to each screw. Clutches are pushbutton operated. Mechanically driven dial type roll opening indicators are mounted on the mill housing. This screw assembly has a 2000:1 ratio and gives accurate pressure adjustment to the mill to control the gage of the strip.

The coilers are mechanically collapsed, or expanded, by a new method, said to be extremely simple and rigid. When expanded, the reels grip the strip for rotation in either direction. The motors driving the reels produce either pull or drag by acting alternately as motors or generators. Sufficient tension is produced by the reel drives so that the strip will be rolled flat and tight on the coil.

The mechanical operation of the mill, in regard to gage control, speed, loading, guides, coiling reels, etc., is identical with the best mill practice.

The three-high principle as applied in the Montgomery Y-mill gives to the mill all of the advantages of the small work roll up to the point of diminishing returns. In other words, the mill combines the advantages of accurate gage control, most satisfactory rolling of very thin strip along with heavier gages, greater overall reductions, lower tension, higher deformation efficiency, reduced forward slip and spread, and lower roll pressures, with production equivalent to conventional mills with large diameter work rolls and equal power and at rolling speeds up to 1200 fpm.

The finish obtained on the strip is comparable to that obtained by similar practice on four-high, or other mills not employing the very small or very large work rolls. Roll changes are made in proportion to the kind of steel, total reductions and tonnages being rolled.

The mill has shown itself to be applicable to both high and low carbon steels and stainless steel for cold reduction and temper rolling.

Barium Base Lubricating Grease

THE introduction of one grease, providing both water and heat resistant characteristics as well as other advantages, has provided the industrial and automotive fields with a lubricant having much wider application than other specific greases, according to C. J. Boner, chief research chemist, and G. W. Miller, president, Battenfield Grease & Oil Corp., in a paper presented before the recent annual AISE convention at Pittsburgh.

The authors pointed out that until the last few years, lubricating engineers were limited in their choice of greases to those which were water-resistant, but with low melting point; or, those which had high melting points, but were not water-resistant. Barium base lubricating greases were described as both water and heat resistant with the added advantages of cohesion sufficient to prevent dripping and to resist centrifugal action, ability to maintain consistency soft enough to allow pumping with ordinary power-operated grease guns at 35°F and lower with hand equipment, rust-preventative qualities, and a melting point above 400°F. Eastern steel mills have records of numerous applications of this lubricant, the authors stated, and a western mill is a regular user of barium lubricating greases. In automotive applications, it was stated that the usual variety of greases required can be reduced to one on many parts.

FIG. 1 — Spraying the Banox rustproofing solution on a range. Excess solution is rinsed off and the remaining coating is insoluble in water.

. . . Production Line

Methods employed for rustproofing of steel parts for electric ranges and heaters on a production line basis at the Newark Stove Co. are described herein. Representing the first major installation of the new Banox rustproofing process, the cost of treating the ranges, including the cleaning operation, is said to be about 5¢ per range.

RUSTPROOFING of electric ranges is accomplished on a production line basis at Newark Stove Co., Newark, Ohio, at a cost, including cleaning and rustproofing, of approximately 5¢ per range. The rustproofing is carried on as part of an assembly line setup which also handles combination stoves and space heaters made by the Newark company for Sears Roebuck.

The rustproofing process used by the company is the Banox process, developed by Calgon, Inc., Pittsburgh. This process has been in use by Newark for more than a year, and company officials report complete satisfaction with the surface protection provided by the Banox coating.

Assembly of the ranges starts on the conveyer line a few yards away from the rustproofing machine. In the first stage of the rustproofing operation, the panels and range skeletons pass into a hot spray bath, at 130°F, in which Calgonite is used to clean the metal. The parts then move into a cool rinse. In the third stage, the material is sprayed with the Banox coating soluton at room temperature, after which it passes into another cold rinse. The fifth and final stage is a hot dichromate rinse of 160°F, after which the materials pass on through a drying oven to the paint vats to be dipped and sent along for baking. The assembly line, including finishing, is about a half mile long. To pass through the five stages of the Banox machine and drying oven requires 20 min.

With many of the castings which are used with Newark combination ranges and space heaters, the use of Calgonite for cleaning is reported to

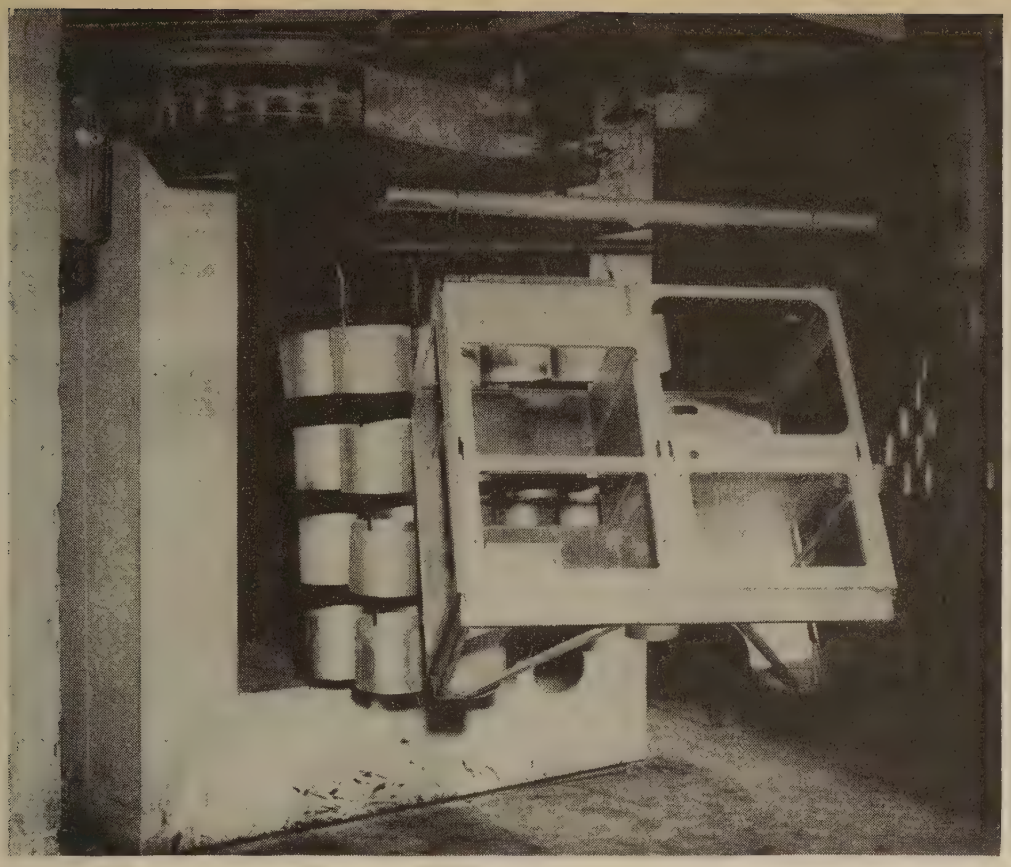


FIG. 2 — Range bodies and panels leaving the drying ovens, on a conveyor, following a final hot dichromate rinse.

Rustproofing . . .

By A. D. STOUT, JR.
THE IRON AGE

have proved extremely useful. Since the castings are sandblasted, there has been a tendency for some of the sand particles to cling and get into the japanning material. The use of Calgonite in the cleaning stage is said to keep all the castings and sheet metal clean and the japan from being polluted, so that only one tank is necessary for dipping both types of material.

Among advantages reported for the rustproofing treatment used at Newark Stove is the saving in scaled coils. Not only are heating coils absent, but the problem of maintenance is simplified because the solutions used are nonscaling.

The Banox process was perfected as a result of work carried out during the war to protect ordnance materials from paint deterioration in tropical climates. The nature of the Banox coating is that of an amorphous, or noncrystalline, substance, similar in physical structure to the resins and plastics used in paint, but entirely inorganic in composition. The coating is continuous and flexible, having no tendency to crack or flake off when metal is formed or suffers deformation by impact. The smoothness of the coating is said to make it ideal for high-gloss finishing.

The Calgonite used in the cleaning operation at Newark Stove is an alkaline detergent especially developed for the spray-washing of metals and other materials. It is said to be noncorrosive to both ferrous metals and the soft metals which include aluminum, magnesium, tin, copper, nickel, zinc, and the soft metal alloys. Calgonite softens water by forming soluble complexes with calcium and magnesium salts of water which normally precipitate insoluble soaps in the presence of fatty oils and greases in alkaline solution. By virtue of its particular water softening, saponifying, and emulsifying properties, this detergent solution can be rinsed freely from the cleaned work in one spray rinse section using unheated water. The clean, cold, wet metal surface resulting from the rinse is in ideal condition for the rustproofing treatment, which is the subsequent operation.

Plating Bath Voltage

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Resistivity data for a number of common plating baths and an explanation of the use of these data for calculating plating bath voltage, particularly useful when using high current density baths, are given in this article. The resistivity data, the authors state, show that high voltages may be required for some plating applications. Such data also indicate the changes in conditions that will reduce the required voltage.

THE electrical pressure required to produce the desired flow of electricity through a plating bath is commonly referred to as the bath voltage. For some plating baths, the normal bath voltage is given with the formula and operating conditions. This value indicates the voltage which should be available if such a plating bath is to be put into operation. If the voltage source is higher than is required to operate the bath, the excess is expended in the rheostat. The bath voltage assumes the usual spacing of anodes, a normal amount of work and normal distance from anode to cathode. If common plating conditions are not used, the voltage will vary from the values given in the operating conditions.

Bath voltage depends on: (1) The potential at the anode; (2) potential at the cathode; (3) resistivity of the bath; (4) size and spacing of the anode and cathode; (5) current applied, and (6) temperature of the bath.

If any of these conditions are altered, the bath voltage will change. Of course, the variables depend on each other, and the potential at the anode, or cathode, cannot be changed without changing one or more of the other variables. An exception to this may occur if an anode is substituted by one containing impurities. In this case the anode may polarize and produce a higher voltage. However, excessive polarization at the electrodes will not be considered here; this article will be restricted to consideration of normal electrode conditions.

If data are available for the resistivity of the various plating baths, a good estimation can be made of the voltage to be expected for a proposed plating installation. For the average installation this is not necessary since most plating baths are operated from a 6 to 9-v line with only a few above this range.

However, if plating is to be done at high current densities, it is convenient to be able to predetermine the probable voltage necessary. At very high current densities, high voltages may be required unless the anode is placed very close to the cathode. For these reasons the resistivities of a number of solutions representative of common plating baths have been measured by the authors.

The resistivity may be measured by use of a Haring cell[1], or it may be measured by use of a conductivity meter. Either method will give sufficiently accurate results for the purpose of this discussion.

The conductivity meter and equipment used for the determination of the resistivity of the plating baths are described in detail by Mohler and Sternisha.[2]

Fig. 1 gives a comparison of resistivity by both methods for a Watts nickel bath. These measurements are in arrangement with the more accurate measurements of Wesley and Roehl.[3] It is important that the Haring cell method check with the results of

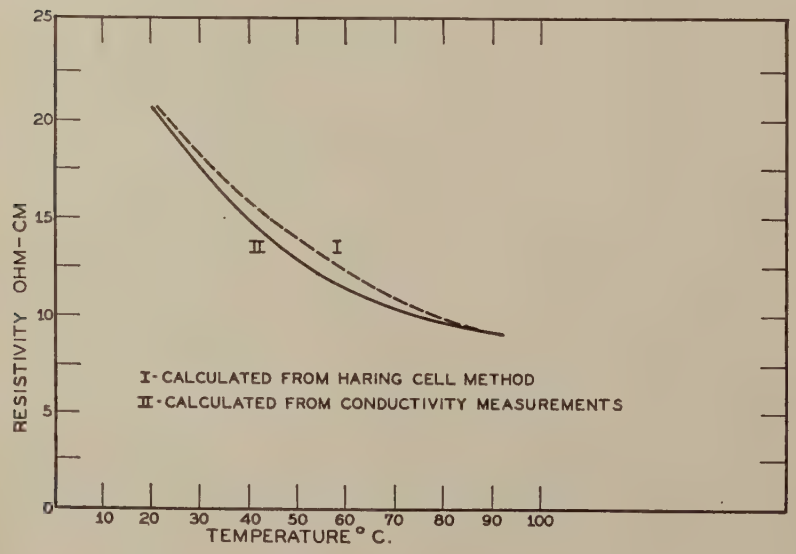


FIG. 1—Resistivity of a Watts nickel bath.

the conductivity meter. The fact that the methods check shows that the one method may be used to calculate the results obtained by the other. This is important because the Haring cell method is a miniature plating tank and the resistivities are to be used for a similar case but on a larger scale. The conductivity meter is a convenient instrument since it can be used for rapid measurement.

The voltage for a plating tank may be estimated from the formula:

$$E = \frac{I r l}{a}$$

where E = bath voltage, I = current, r = resistivity, l = distance from anode to cathode, and a = average cross-sectional area.

In order to employ this equation, some assumptions must be made. These are justified on the basis that the resulting voltage is a reasonable estimation.

It is assumed (for purposes of calculation only) that the volume through which the current flows is defined by straight lines from the anode to the cathode. In other words, all current will leave only from the front of an anode and the current distribution over the front of the anode will be uniform. Actually this is far from true. Nevertheless, the calculation will give the maximum voltage, and the larger the anode and cathode areas and the more confined the anode and cathode are, the more accurate the calculation will be. The calculation is accurate for the Haring cell where the current is uniform and confined by the sides of the cell. It will also be assumed that for the cases where polarization is low that the combined electrode voltages will not exceed 1 v and that for alkaline tin and chromium, 2 v is a good approximation.

Representative plating baths were selected from vol. 80 of the Transactions of the Electrochemical Society as representative of modern formulations. The resistivity was measured for each bath in order to have data for a specific concentration of chemicals. At the same time the Baumé gravity was measured since gravity data may often be of value to supplement resistivity data.

The chemical concentrations, the resistivity at 25°C (77°F) and the gravity at 25°C (77°F) are shown in table I.

Measurements were taken at higher temperatures to show how resistivity decreases with increase in temperature. These data are shown in fig. 2.

The following examples illustrate how bath voltage may be calculated on the basis of the equation previously given: Assume 1 sq ft of anode and cathode area and an electrode distance of 6 in.

Watts Nickel Bath Voltage Requirements

Current density 30, temperature 40°C

I = 30 amp

r = 15 Ohm-cm

l = 15.3 cm

a = 930 sq cm

$$E = \frac{Irl}{a} \text{ or } 30 \times 15 \times \frac{15.3}{930} = 7.4 \text{ v}$$

TABLE I

Chemical Concentrations, Resistivity and Gravity of Various Plating Baths

	Concentrations, g per liter	Ohm-Cm 25°C (77°F)	°Be 25°C (77°F)
Brass Bath			
Copper cyanide	30	12.4	10.9
Zinc cyanide	10	....	....
Sodium cyanide	56	....	....
Sodium carbonate	30	....	....
Cadmium Bath			
Cadmium oxide	30	7.3	11.3
Sodium cyanide	110	....	....
Chromium Bath			
Chromium oxide	250	2.0	21.6
Sulfuric acid	2.5	....	....
Acid Copper Bath			
Copper sulfate	200	5.6	20.6
Sulfuric acid	75	....	....
Rochelle Copper Bath			
Copper cyanide	26	14.3	11.0
Sodium cyanide	35	....	....
Rochelle salts	45	....	....
Sodium carbonate	30	....	....
High Efficiency Sodium Cyanide Copper Bath			
Copper cyanide	120	6.8	22.0
Sodium cyanide	135	....	....
Sodium hydroxide	30	....	....
High Efficiency Potassium Cyanide Copper Bath			
Copper cyanide	56	5.9	13.9
Potassium cyanide	85	....	....
Potassium hydroxide	41	....	....
Acid Lead Bath			
Lead fluoborate	105	4.5	22.6
Fluoboric acid	40	....	....
Watts Nickel Bath			
Nickel sulfate	240	19.5	21.7
Nickel chloride	45	....	....
Boric acid	30	....	....
Sulfuric acid	0.23	....	....
Cyanide Silver Bath			
Silver cyanide	40	9.1	12.7
Potassium cyanide	60	....	....
Potassium carbonate	60	....	....
Alkaline Tin Bath			
Sodium stannate	90	16.2	11.6
Sodium hydroxide	8	....	....
Sodium acetate	15	....	....
Cyanide Zinc Bath			
Zinc cyanide	60	7.7	12.0
Sodium cyanide	23	....	....
Sodium hydroxide	53	....	....
Acid Zinc Bath			
Zinc sulfate crystals	240	21.0	19.5
Ammonium chloride	15	....	....
Aluminum sulfate	30	....	....
Alkaline Cleaner			
Sodium carbonate	30	19.0	5.8
Trisodium phosphate	15	....	....
Sodium hydroxide	8	....	....

Electrode polarization of about 1 v must be added so that a voltage source of at least 9 v would be recommended to operate this particular bath under the given conditions. Actually the tank voltage would be somewhat less than calculated because the volume of solution between the electrodes is not confined. But the calculation is a good estimate of maximum voltage required. If the anode area is decreased, the voltage will increase, and if the electrode distance is increased, the voltage will also increase. These factors must be kept in mind, as well as the line loss, which may amount to 1 v, and also the required voltage drop across the rheostat for control purposes. A drop of about 2 v is usually required across the rheostat.

Silver Bath Voltage Requirements

Current density 10, temperature 30°C

I = 10 amp

r = 8.5 ohm-cm

l = 15.25 cm

a = 930 sq cm

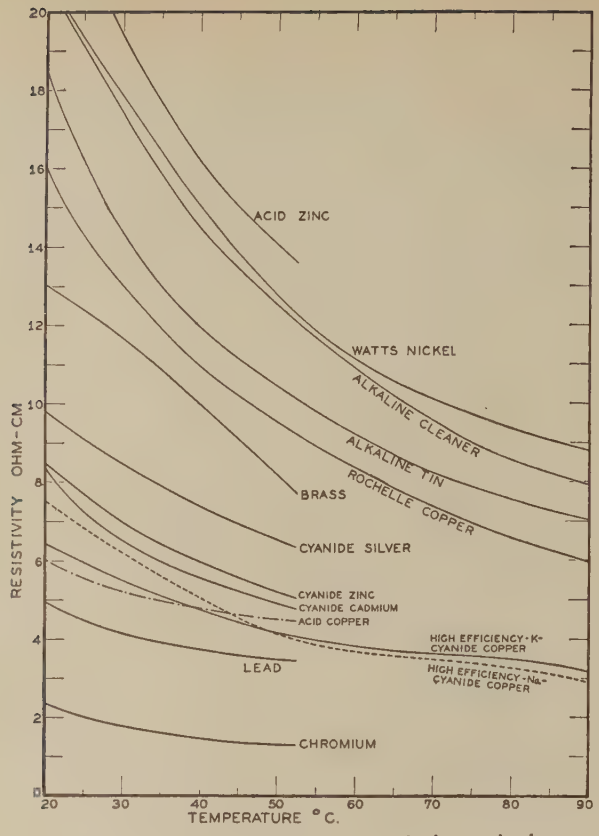


FIG. 2—Resistivity of various types of plating baths.

$$E = \frac{Irl}{a} = 10 \times 8.5 \times \frac{15.3}{930} = 1.4 \text{ v}$$

Electrode polarization will probably be about 0.5 v in this bath. The general remarks are the same as for the nickel bath except that with use carbonate increases in the bath which in turn decreases the resistivity of the bath. For the silver bath, then, one would operate from a 6-v line with about a 3-v drop across the rheostat.

Chromium Bath Voltage Requirements

Current density 200, temperature 40°C

I = 200 amp
r = 1.5 ohm-cm
l = 15.25 cm
a = 930 sq cm

$$E = \frac{Irl}{a} = 200 \times 1.5 \times \frac{15.3}{930} = 5.0 \text{ v}$$

An electrode polarization of about 2 v may be obtained so that this bath would have to be operated from a 7 to 9-v source. With a shorter electrode distance or a higher temperature or higher concentration bath, a 6-v current source may be used. The bath has a low resistivity but high voltage is necessary because of the high current density employed.

High Current Densities

If high current densities are employed to increase the plating rate, then high voltage is required. In rapid plating, agitation is required so that the electrode polarization will not be much greater than for still plating. Polarization increases with current density but it is decreased by agitation. Table II shows the probable normal electrode polarization of the common plating baths and the calculated voltage for various current densities. The calculations are on the basis of 1 ft electrode distance and 25°C (77°F). By reference to this table an estimation can be made for a wide range of plating conditions.

Table II shows immediately that very high voltage may be required for plating under extreme conditions, indicating the value of resistivity data. For the unusual plating applications, an estimation of bath voltage should be made.

Table II shows a voltage of 65 required for a Watts nickel bath at a current density of 100 amp per sq ft. By increasing the temperature, by using a chloride bath and by reducing the electrode distance to ½ in., a nickel bath may be operated at 500 amp per sq ft from a 6-v line.

Table II also shows a voltage of 63 required for an alkaline cleaner, to obtain a current density of 100 amp per sq ft. Yet many cleaners are operated at this current density from a 6-v line. This is accomplished by using a high temperature and a high caustic content in the bath.

Summarizing, then, resistivity data show that high voltages may be required for plating applications and indicate the changes in conditions that will reduce the required voltage.

TABLE II

Probable Normal Electrode Polarization for Common Plating Baths and Calculated Voltage for Various Current Densities

Bath	Estimated Electrode Polarization	Voltage at Current Density	
		10 amp	100 amp
Brass	0.3–0.7	4.5	41
Cyanide cadmium	0.5–1.0	3.0	24
Chromium	1.0 2.0	2.5	7
Acid copper	0.2 0.5	2.2	19
Rochelle copper	1.0	5.7	48
High eff. sodium—cyanide copper	1.0	3.2	23
High eff. pot.—cyanide copper	1.0	2.8	20
Acid lead	0.2–0.5	1.8	15
Watts nickel	1.0–1.5	7.5	65
Cyanide silver	0.5–1.0	3.5	31
Alkaline tin	1.0–3.0	7.0	53
Cyanide zinc	1.0	3.5	26
Acid zinc	0.1–0.2	7.0	69
Alkaline cleaner	0.5	6.7	63

References

[1] H. E. Haring and W. Blum, Trans. Amer. Electrochem. Soc. 44, 313 (1923).

[2] J. B. Mohler and Jean Sternisha, Metal Finishing, 44, No. 2, 58 (1946).

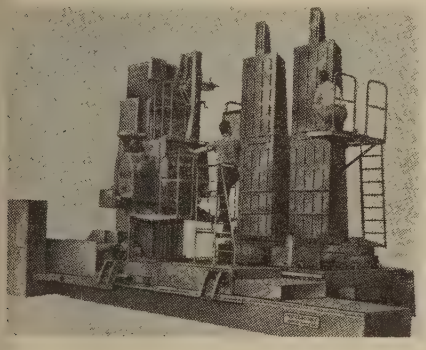
[3] W. A. Wesley and E. J. Roehl, Trans. Electrochem. 86, 419 (1944).

New Equipment . . .

A tracer-controlled milling machine, 30-ton combination shear and press, spot and seam welders, a multi-purpose bending machine, hydraulic index table, thickness gage, hardness tester, and gas combustion units are described in the following pages. Also shown are seatless valves, pressure fans, solenoid contactors and several other new or improved items.

Milling Machine

DESIGNATED type BG-22 Keller, a tracer-controlled milling machine introduced by *Pratt & Whitney Div.*, West Hartford 1, Conn., has been designed to ma-



chine automotive body dies 10 ft long and 5 ft high. The machine automatically reproduces in metal the shape of a master form or model. The job may be either profiling in two dimensions or the reproduction of impressions and reliefs in three dimensions. In each case, as the tracer passes over the master form, the cutter duplicates its path in the work. Electrical control provides continuous automatic speed variations and permits machining from models at high speeds and with great accuracy, it is claimed. Design features include complete control of the machine from one main operating station on the spindle head. Each angle plate fixture has a fixed platform with a retractable counter-weighted extension to facilitate setting up models. Starters, relays and electrical apparatus are located in one control cabinet. The BG-22 operates from any conventional polyphase 50 or 60 cycle ac source and has a horizontal travel of 120 in., a vertical travel of 60 in. and an 18-in. transverse travel with an additional 6 in. obtained by means of transverse spindle adjustment. Table working surface is 150x92 in.; spindle speeds range in 14 changes from 20 to 1200 rpm.; horizontal and vertical feed rates range from 3 to 30 ipm.

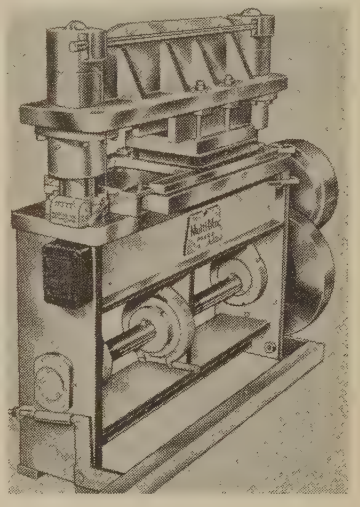
Finishing Machine

DESIGNED for combining four finishing operations on a cylinder block with clutch housing assembled, a special machine tool developed by *Cross Co.*, Detroit 7, simultaneously finishes bores, chamfers and faces the clutch housing and straddle faces the rear end main bearing thrust faces. Standard carbide-tipped tool bits are used for all operations instead of milling cutters. Both loading and clamping are done by power and the machining cycle is automatic. All traverse and feed movements are hydraulically operated. For boring and chamfering, a bar feed movement through the center of the right head is used. Facing is done by cross movement of a slide mounted on the same head. As the head revolves, the facing tool is fed

out to produce what is described as a phonograph finish. This type of surface is said to provide better seating of the gasket at final assembly. The straddle facing operation is performed at the left end by means of two tools mounted in a tool holder and operating with the cross slide.

Thirty-Ton Shear and Press

KNOWN as the Multi-Max press, a 30-ton combination shear and press has been developed by *Parker Mfg. Co.*, 2200 Colorado Ave., Santa Monica, Calif. Mechanically operated, it shears, blanks, notches, punches, perforates, slots, pierces, lances, bends and forms sheet metal parts in

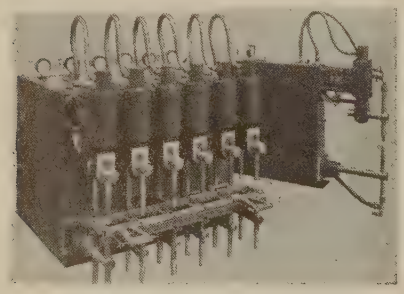


single or multiple units, with one operator. It needs no special foundation, has no overhanging parts and requires only 36 x 75 in. floor space so that it can be moved in and out of the production line as needed. The Multi-Max is of all steel plate welded construction. Stroke is 2 in., as is the ram adjustment. Shut height is 10 in. Bed die space is 12 x 36 in.; ram die space, 10 x 36 in. Bed opening is 5 x 32 in. A 1½ hp, 3 phase motor is furnished with each press, capable of producing 100 strokes per min.

Spot Welder

DESIGNED for use as a general purpose bench mounted welder or for ganged use in multiple production, an automatic spot welder released by *Metron Instrument Co.*, 432 Lincoln St., Denver 9, incorporates controlled air-operated electrode pressure, adjustable

current setting, electronic timing, water cooling of the transformer and electrodes and automatic pressure initiation of current. A small foot-actuated air valve controls the welding sequence when the unit is employed as a general purpose unit. Electrode pressure is adjustable from zero to approximately twice the airline pressure. Welding current is automatically applied after the electrode pressure has reached a predetermined pressure



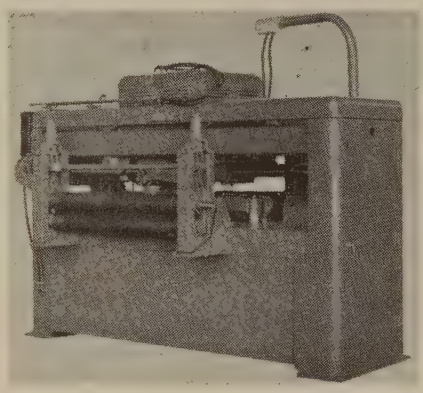
setting which is adjustable from zero to approximately 90 psi in cylinder pressure. The electronic timer controls the current duration from 1/30 to 2 sec. A four-position head control switch provides adjustment of current for light and heavy work. Nominal rating of the transformer is 8 KVA; however, it is claimed the units will easily weld two pieces of 12-gage steel. Units are supplied for 220 v, 60 cycle operation and are also available for 440-v operation. Dimensions are 4 in. wide, 32 in. deep and 24 in. high with a 12-in. throat.

Air-Hydraulic Press

ANNOUNCEMENT of a small air-hydraulic press with capacity of 1200 lb has been made by *Air-Hydraulics, Inc.*, 401 Broadway, New York 13. The press does assembling, flanging, broaching, forming, marking, riveting, crimping, etc. The 1200-lb pressure is based on an air inlet pressure of 100 lb, 12 to 1 ratio. It has a 6-in. throat, 2½-in. stroke, ¾-in. ram, 5-in. sq platen and is suitable for bench mounting. Spring or power return are optional. The press is constructed with heavy ribbed castings and a solid steel shaft that affords a vertical adjustment up to 6 in.

Seam Welder

A DOUBLE roll traveling head series seam welder has been developed by *Federal Machine & Welder Co.*, Warren, Ohio, for use in strip mills and in other plants where it is desirable to join strip ends or skelps for long machine



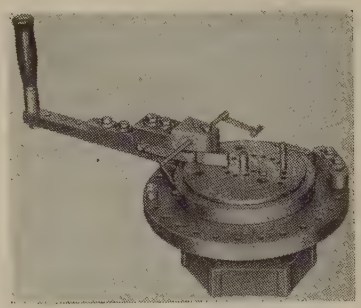
runs. The new 125 kva welder unit makes any strip mill continuous, it is said. The machine is supplied in four standard sizes for welding 38, 48, 56 and 66-in. line either right-handed or left-handed. A notable feature is the change-speed gear which gives selective speed range of 10 to 27 fpm or 20 to 54 fpm. The unit is of fabricated steel construction throughout. It is furnished with a 125 kva totally enclosed, air-cooled transformer wound for 220 v, 60 cycle, single-phase, alternating current power supply and has 16 steps of heat regulation.

Carbide Lapping Tools

SOLID carbide center-lapping tools in standard sizes, ½x1½ in. and ⅜x1½—60°, included angle, have been announced by *Raymac Mfg. Co., Inc.*, 3729 Cass Ave., Detroit. The company points out that the tool is designed to replace abrasives and that it can be reconditioned from 25 to 60 times with no change in quality of operation. It can be used in standard center-lapping machines or drill presses in working metal up to 62-65 Rc hardness. All tools are precision ground by hand.

Precision Bender

FOR forming requirements calling for large radii in lightweight materials at a high rate of production, *O'Neil-Irwin Mfg. Co.*, 302 8th Ave., Lake City, Minn., has added the No. 1A to its line of Di-Acro benders. A multi-purpose bending machine, the unit is said to form and duplicate an unlimited variety of parts and pieces on a production basis. The bender is also said to create shapes and outlines impractical or impossible to obtain with regular production dies. The range of contour forming includes all types of ductile materials such as round, half-round, hexagon and square rod, tubing, angle, channel, molding, strip stock and bus bar. Radius capacity of the No. 1A is 0 to 6 in., height of forming nose, ¾ in. and operating leverage, 16 in. A



variety of conversions for all sizes of Di-Acro benders are available for numerous specialized forming operations.

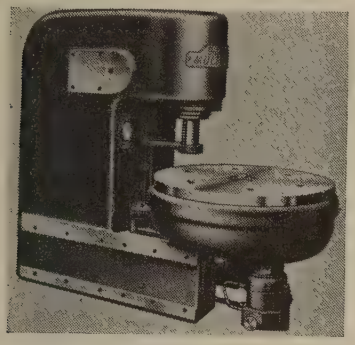
Cutting Oil Additives

TWO cutting oil additives, Cresol Z-2 and Cresol Z-2A, developed to assist in the production of cutting oil coolants, drawing compounds, metal rolling, forming and extreme pressure lubricants, have been introduced by *Lubricants, Inc.*, Fisher Bldg., Detroit 2. These oils are said to be particularly adapted to the machining of S and C steels, Monel metal, chrome, chrome molybdenum, chrome nickel, tungsten and stainless steels. The oils are described as modified sulfur-chlorides containing as high as 40 pct sulfur and 30 pct chlorine. They are claimed to be stable, do not stain ferrous metals and will not gum or decompose when used as recommended. When added to light mineral oils, preferably light paraffin, the resultant product is transparent and makes possible observation of work.

Hydraulic Index Table

OPERATING directly off the hydraulic system of the press with which it is being used, a self-contained six-station index table has been developed by *Denison Engineering Co.*, 1160 Dublin Rd., Columbus 16. Action is interlocked

and positive. The ram cannot descend while the table is in motion, it is said, and the table will not rotate until the ram has com-



pleted its cycle. The dial of the index table is actuated by a Denison Hydroilic fluid motor which is equipped with speed control regulation permitting 10 to 70 indexes per min. When used with a Multipress, action of the table and press is completely automatic. Through punching at a station 120° on either side of the pressing station is provided and a skip-station feature can be furnished permitting the pressing ram to skip any number of specified stations around the dial.

Die Set Guide Pin Bushings

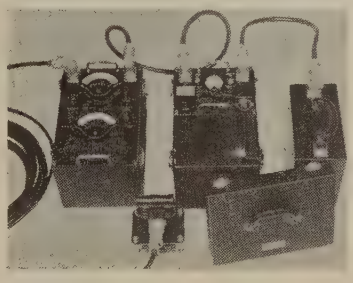
LOW friction bushings designed to increase the accurate life of die sets have been announced by *Standard Machinery Co.*, 1518 Elmwood Ave., Providence 7. These guide pin bushings consist of a basic hard steel body with a special bearing bronze liner electrolytically alloyed with indium. The liner is keyed in position by an internal groove and provided with coined, spherical impressions which serve as oil pockets or reservoirs. An electrolytic plating and heat treatment process sets a layer of indium over the bearing area and penetrates the surface. This alloying action is said to provide a surface harder than the indium or the base metal. Indium bronze bushings are available in seven sizes ranging from 1 to 3 in. ID.

Seatless Valve

A VALVE incorporating a design claimed to eliminate the valve seat, washer and all wearing parts has been marketed by *Knowles-Fisher Corp.*, Gowanda, N. Y. The valve is said to open and close without mechanical pressure. Dirt, scale or abrasive will not affect operation. Shut-off is positive and gland packing has been eliminated. The valve has been designed to allow pressure to build up gradually thus preventing hammering and chattering. A polished stem engages with two wear-resistant synthetic rubber collars, one at each end of the valve. In opening, the stem is withdrawn from the lower collar, permitting an even flow of liquid through the outlet. The stem is retracted into the upper collar forming a seal and preventing moisture from entering the activating threads. Valves are available in a complete line.

Thickness Gage

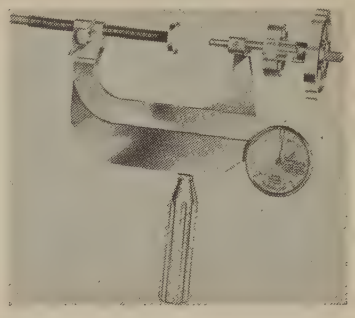
A PRECISION instrument for measuring corrosion and wall thickness from one side of metallic surfaces is announced by the *Scott Electroflux Co.*, Waltham, Mass. The gage is designed for nondestructive testing and inspection of metallic containers, vessels and piping while in service. Measuring thickness is said to be within 3 pct of actual thickness. In its practical form it is described as combining a four-electrode probe, a small 6-v battery, an electronic voltmeter and power supply for measuring



low-voltage output from the probe, and interconnecting cables to permit the probe to be moved about at a distance from the metering equipment. Capacity is from 0.125 to 2.250 in.

Hardness Tester

A 4-in. capacity portable hardness tester weighing slightly over 3 lb and reading directly in the Rockwell hardness scales is offered by *Ames Precision Machine Works*, Waltham 54, Mass. Rounds and flats, both hard and soft, from very thin up to 4 in. are tested quickly and accurately, it is said. The frame is shaped like that of an ordinary micrometer and is sprung slightly when pressures are applied to the penetrators by turning the handwheel. A diamond penetrator is used for testing hardened steel, and ball penetrators for testing soft materials, as specified in the Rock-



well chart. The indicator dial has graduation lines which show when pressures of 60, 100 and 150 kg are applied. Rockwell readings are taken from the graduated barrel dial which is located beneath a lucite magnifier for easy reading.

Electric Heat-Treating Furnace

FEATURING electronic control and having 1725 cu in. of usable muffle, the Lucifer electric heat-treating furnace has been announced by *Gilbert S. Simonski*, 405 N. Broad St., Philadelphia 8. Temperature is preset on a dial and automatically remains there. It is claimed that this Model DL 7052 shows a temperature of 1600°F in 40 min, 2000°F in 72 min. The furnace is fully powered for any job and is rated at 6.5 kw. Construction is rugged with welded angle frame upon which is built the metal housing assembly. A special featured construction is said to permit the whole refractory assembly to expand and contract with the firing and cooling of the furnace without undue heat loss. DL 7052 is regularly a floor model but may be obtained in a bench model.

Electroplating Rack Tub

A RACK tub designed for the application of plastic resin stop-off coatings on electroplating racks in the plant has been released by *Miskella Infra-Red Co.*, Grand Ave., Cleveland 4. The tub is said to be particularly suited for the preheating and final baking operations essential to proper processing. Racks so coated are claimed to offer complete resistance to strong alkalis, concentrated acids and oxidizing agents such as chromic acid. With infra-red baking the heat is

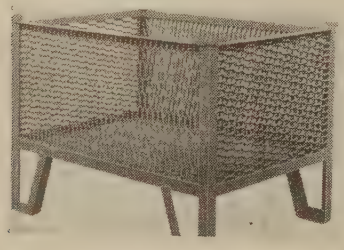
first stored in the metal rack and causes the baking to be done from the inside out. The rack tub is a portable unit for operation on a single-phase 230-v line and three-phase wiring is available. Total load is 8 kw, or 35 amp. Two heat zones are each controlled by a 30-amp fused switch so lower half can be turned off when processing shorter racks. Sixteen toggle switches further control various settings of the 32 fixed-focus 250-w lamps furnished with each tub.

Flexible Shaft Tool Kit

ANNOUNCEMENT of a flexible shaft tool kit designed for industrial use where a wide range of speeds is required, has been made by *Flex-O-Shaft Sales Co.*, Prairie View, Ill. The unit is provided with three collets for standard ⅛ and 3/32 in. shank-mounted wheels and will accommodate drills and special tools from ⅛ to 0.028 in. diam. The handpiece is slender, made of aluminum with precision ball bearing at chuck end. Motor is 1/16 hp, 6000 rpm, full load, 110-120 v, ac or dc. The kit contains an assortment of 66 popular tools, packed in a wooden cabinet.

All-Steel Ventilated Box

A HEAVY-DUTY, all-steel ventilated box has been announced by the *Palmer-Shile Co.*, 16005 Fullerton Ave., Detroit 27, designed especially for foundry installations where uniform cooling is a requirement. It also prevents the loss of sand due to dumping, since the sand drains through the sides of the box. The box is



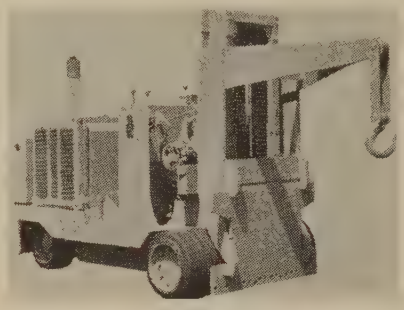
adapted for use in forge, casting or heat treating departments and can be used wherever there is a need for rapid, uniform cooling of hot metals. Constructed of heavy gage steel mesh on four sides and bottom, with all-welded angle iron framework, the box is built with legs for use with fork lift trucks or cranes, or can be built with casters, rubber or metal wheels.

Axial Flow Pressure Fans

A LINE of axial flow pressure fans has been announced by the Sturtevant Div., *Westinghouse Electric Corp.*, Hyde Park, Mass. Two basic types are available: the straight-through type or the convertible elbow type, both furnished with either the three bladed aluminum alloy wheel or eight blade steel wheel. Applications include air conditioning, dust and fume removal, machinery cooling, mechanical draft for combustion, industrial drying and processing. Fans are designed for horizontal or vertical operation. Sizes vary from 18 to 72 in.; static pressures from 0 to 3 in. and displacement from 2000 to 115,000 cfm.

Boom and Hook Lift Truck

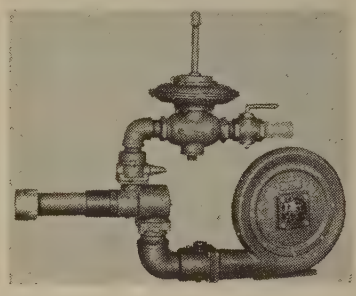
A SPECIAL boom and hook fork truck for handling awkward castings and for general use in heavy industries is available from *Yale & Towne Mfg. Co.*, Tacony



St., Philadelphia 24. The hook has an outreach of approximately 4 ft and can lift loads up to 18,000 lb. The truck, when the boom attachment is removed, operates as a normal fork truck. Channel uprights tilt forward or backward to prevent the load from spilling or striking the truck when negotiating grades. Additional features include: rear wheels equipped with 8x22-in. tires; double-width front drive wheels, each equipped with two 8x22-in. tires; four forward speeds in addition to the reverse speed; and Cam-O-Tractor control operating in conjunction with a time delay relay to automatically govern the speeds of the truck.

Gas Combustion Units

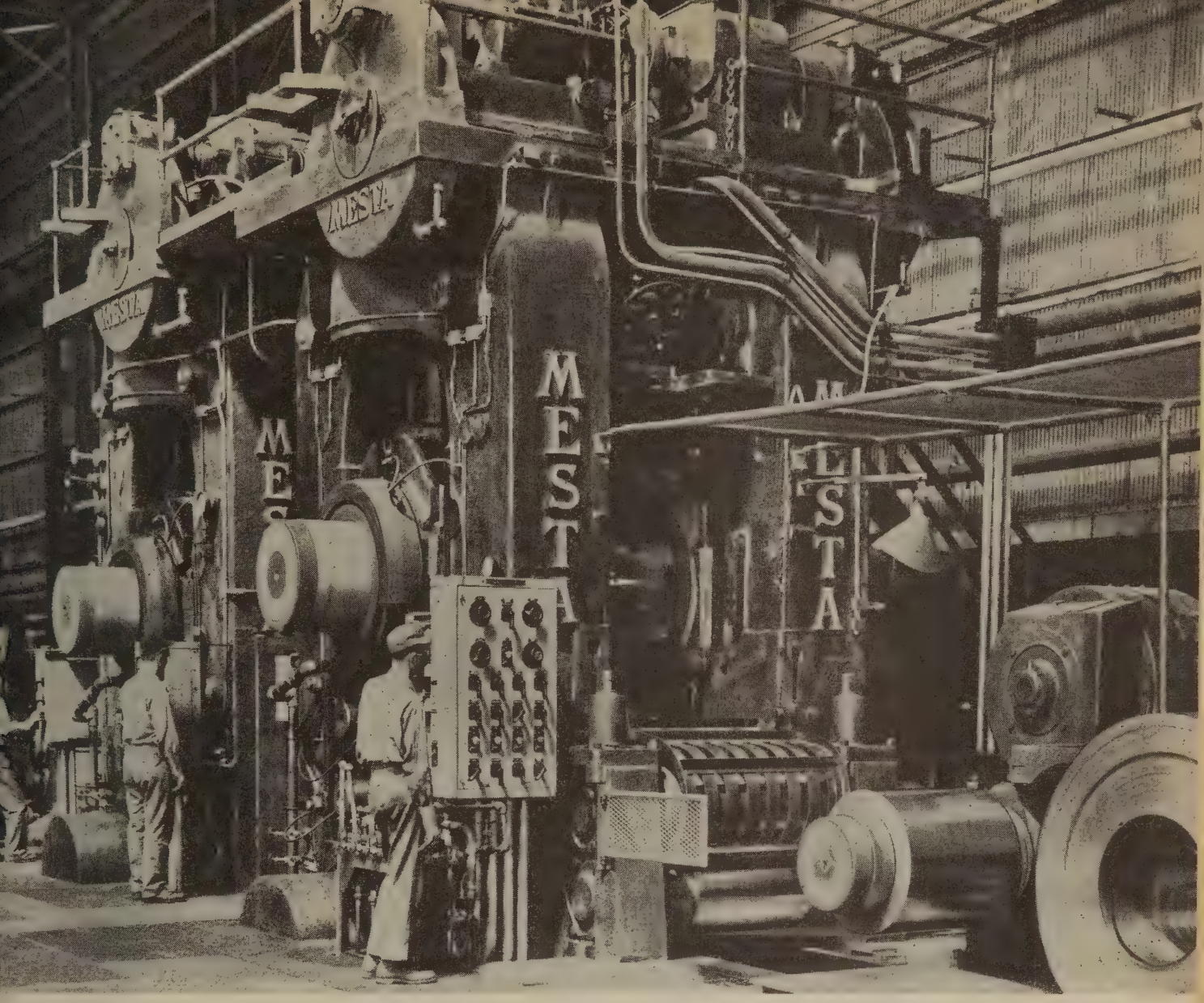
CALLED the Bryant Pow-R-Semblies, a line of pre-engineered gas combustion assemblies has been announced by the Industrial Div., *Bryant Heater Co.*, 17825 St. Clair Ave., Cleveland. These packaged units are adapted to firing boilers, air heaters, dryers, ovens, kilns and wherever semi-open burners with controlled flames are desired. Combining air handling, gas supply, mixing and burning elements, the assemblies are



single burner units, but twin-nozzle burners can be supplied. Heart of the unit is the Mixjector, a compact proportional mixing device which uses air from a constant pressure blower, draws gas through a zero governor in whatever quantity is required for the selected mixture and supplies the mixture to the burner nozzle. The Pow-R-Semblies are available in 8 capacities, ranging from 400,000 Btu-hr rated at 8 boiler hp, with a 1½-in. gas inlet and ⅓ hp blower to the largest unit with a rating of 3,300,000 Btu-hr and 66 boiler hp, a 3-in. gas inlet and 3 hp blower.

Solenoid Contactors

DEVELOPMENT of Bulletin 4451, size 1 ac solenoid contactors has been announced by *Ward Leonard Electric Co.*, Mount Vernon, N. Y. These solenoid-operated control devices are designed for use as main line, reversing or accelerating contactors on ac motor controllers for machine tools, air-conditioning equipment, pumps, compressors, etc. They are also suitable for remote control of heater loads and tungsten or infrared lamp loads. Outstanding features include compact unit construction, rapid consistent operation, high arc and interruption capacity. The solenoid contactors are equipped with double break silver-to-silver contacts and parts are arranged on a steel mounting plate. The units are available with four main poles and have maximum ratings of 7½ hp, 440-550 v on 3 phase, 60 cycle circuits. Standard operating coils are obtainable for 110, 220, 440 and 550 v operation on frequencies of 25, 50 and 60 cycles.



All required tempers can be produced on Mesta High-Speed Twin Four-High Cold Skin Pass Mills. These mills feature new types of drives and control systems which maintain synchronization during acceleration, deceleration, and at normal operating speeds.

MESTA

Cold Mills

DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE COMPANY · PITTSBURGH, PA.

Assembly Line . . .

WALTER G. PATTON

• Labor problem unsolved as car producers prepare for model changes . . . Pensions for auto workers will be a top union demand despite defeat at Ford . . . Hudson to be shown privately this week.

DETROIT—It is interesting to look at labor conditions in Detroit on the eve of the first of the current model changeovers and to contrast this situation with previous experience by the automobile industry. According to the State Unemployment Commission, unemployment in Michigan dropped 2600 during the late summer bringing the total to 109,000. At the same time employment totaled 2,041.000 including 1,043,500 workers in manufacturing and 997,600 in nonmanufacturing jobs. During the period being considered 9700 workers were on strike. Total employment in the Detroit area in August according to the latest report amounted to 1,070,130 out of an estimated available labor force of 1,136,030.

In contrast to some earlier experience here, changeover operations in 1948 are encountering considerable difficulty because of the shortage of skilled workers in many classifications. Hudson Motor Car Co., for example, conducted an active campaign to attract qualified workers necessary to complete the changeover program which has been accomplished in the comparatively short period of 4 weeks. Highly skilled tool and die workers are much in demand. Detroit daily papers are filled with ads in large type for diemakers, die try-out men, welding operators, machine repairmen, pattern makers, and casting layout men.

Practically the only indication that activity in the automobile industry is falling off is the recent drop in prices of used cars being sold on fabulous Livernois Ave., in Detroit. During the past 2 weeks the market price of used cars is reported to have broken badly. Veteran auto dealers are complaining bitterly that the bottom has fallen out from under the Detroit used car market. However, there have been previous temporary recessions in Detroit used car prices. Informed sources, therefore, are not interpreting the present relapse as a permanent condition, although it would not surprise many observers if the used car prices failed to reach the dizzy heights which have been recorded here during the past 2 or 3 months.

To convey some idea of the amount of inflation in used car prices in Detroit, a purchaser of a 1946 Plymouth recently drove his car 23,000 miles before selling it to a used car dealer. Because of the high price received for his car, this particular buyer was able to purchase a 1947 Plymouth, install several accessories that were not on the 1946 car, and still have some money in his pocket. Obviously, conditions like these could not continue indefinitely although there can be little doubt that many car buyers in a position to make such a profitable transaction have exercised the opportunity to do so.

FRANK RISING of Automotive & Aviation Parts Manufacturers, Inc., has suggested that a booklet of more than unusual interest could be written on the subject, "Who Pays for Pensions?"

Mr. Rising argues that the average worker doesn't know much about such things—that it all comes down to a question of how much the consumer will stand, assuming productivity doesn't rise high enough to balance the added cost of the product.

The AAPM head sums it up this way: In the long run those who work carry those who don't work. It's this way with all charity, gratuities, and "free" pensions, he argues. The kind of pensions the autoworkers are demanding, according to Mr. Rising, is one wherein "employer"—who he insists is anyone who buys a car—pays the heavier part of the money destined to support the beneficiary who "retires."

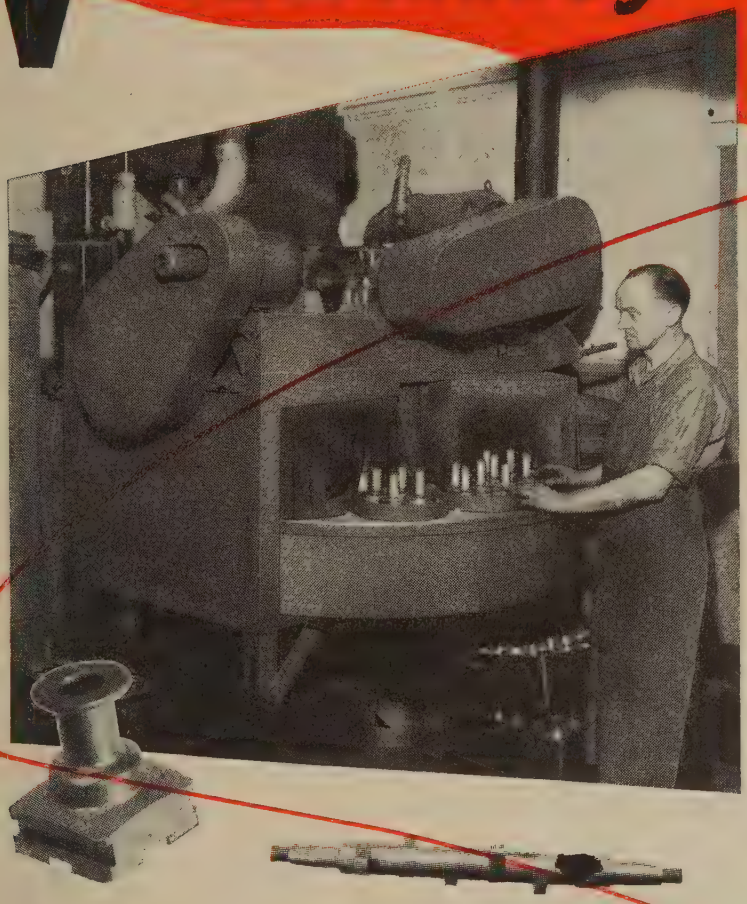
Mr. Rising also asserts that employees of the union aren't making these pension demands. In the only case where employees got to vote thus far, he argues, they turned down the pension which the union had so noisily demanded, negotiated and approved.

Meanwhile, the union's up-to-date idea of adequate pension plans has been made known in a recent letter by Walter P. Reuther to H. W. Anderson, GM vice-president. Mr. Reuther pointed out in the letter that a pension plan in lieu of wage increases would not be acceptable to GM workers. He explained that any GM pension would have to equal 50 pct or more of wages with full credit for past years of service and that the company would be expected to contribute 50 pct of the cost of the program. Mr. Reuther said the auto workers would ask for joint administration of the program with the corporation, the right to approve and expand the program by collective bargaining, and reduction of the retirement age below 65 for workers in heavy jobs. Workers will also ask the right to realize their equity when quitting before the retirement age, he said.

Informed sources here believe that GM will strongly resist any pension demands by the union. Also, it is always safe to assume that Walter Reuther throws in many of his demands for "bargaining purposes." In addition, the fact that these demands are being made just prior to the UAW (CIO) convention may be an important factor in the present situation.

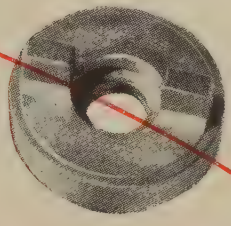
Observers here believe the automobile industry will hear a great

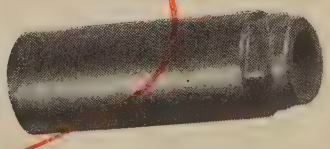
Versatility IN CLEANING HEAT TREATED PRODUCTS

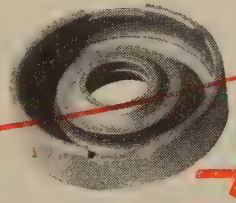


In the manufacture of complex mechanical and electrical devices, American Bosch Corporation, Springfield, Mass., encountered the problem of cleaning thousands of different metal parts. Since sizes and shapes varied considerably existing cleaning equipment was unable to handle the large and diversified volume of pieces.

This progressive organization investigated various types of blast cleaning equipment and decided upon an airless WHEELABRATOR MULTI-TABLE. In operation the machine was found to be most practical for general deburring and to impart an excellent pre-plating surface to a wide variety of parts.

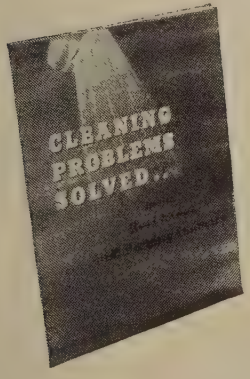






How American Bosch Corporation Is Using This Versatile Blast Cleaning Machine

- Removing heat treating "skin" from hardened fuel injection parts prior to grinding.
- Cleaning heat treated parts to prepare them for cadmium and zinc plating.
- Cleaning of pieces prior to nitriding to obtain uniform nitriding.
- Preparation of magnesium and aluminum parts for anodizing and dichromating.
- Determining varying zones of hardness in sectioned forgings, bar sections, etc., after heat treatment.



Write for the latest treatise, "CLEANING PROBLEMS SOLVED For Heat Treating and Forging Plants." Learn TODAY how AMERICAN can solve YOUR cleaning problem.

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WHEELABRATOR AND EQUIPMENT CORP.

(Formerly American Foundry Equipment Co.)

510 South Byrkit Street, Mishawaka 3, Indiana

Representatives In Principal Cities

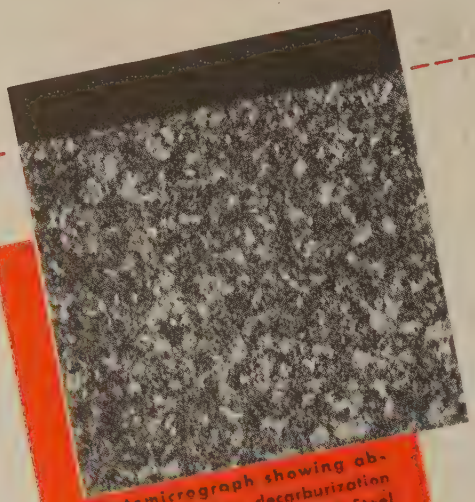
WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

NEUTRAL HARDENING

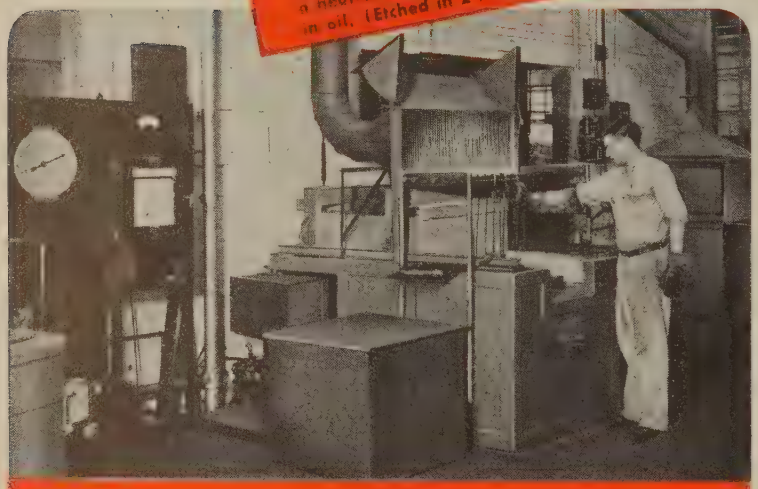
means just what it says . . .

No Scale No Decarb

. . . and an amazing volume of work can be treated in small, relatively inexpensive salt bath equipment.



Photomicrograph showing absence of scale or decarburization in a section of S.A.E. 1095 Steel (X100) hardened at 1500° F. in a neutral salt bath and quenched in oil. (Etched in 2% Nital.)



Prominent machine tool manufacturer obtains full hardness in a wide variety of carbon and alloy steel parts without scale or decarburization in this AJAX Neutral Hardening Salt Bath Furnace—"the busiest furnace in the plant."

A neutral salt bath provides an ideal means of heating carbon or alloy steel parts without any deleterious effect on the surface, such as scaling, pitting, carburizing or decarburizing. The bath completely seals out all air while work is heating . . . and a thin film of salt remains when work is removed, protecting it right up to the instant of quenching.

All "protective atmospheres," gas generating equipment and specially trained operators required for their use are eliminated . . . with corresponding savings in initial expense, operating costs and floor space requirements.

Heating cycles are 4 to 6 times faster than in atmosphere or radiant type furnaces—enabling small furnaces to handle a large volume of work—because heat is transferred by conduction rather than by convection or radiation, all surfaces of the work being in direct physical contact with the molten salt. Heating, therefore, is both rapid and uniform . . . eliminating the cause of most distortion.

Unique internal heating principle of the AJAX furnace —utilizing patented, closely-spaced, immersed electrodes—produces an automatic electrodynamic stirring action within the bath which contributes to faster heating of the work and assures a temperature variation of less than 5° F. throughout the bath.

This internal heating feature also permits use of long-lived ceramic pots, avoiding contamination of neutral baths by metallic oxides produced by metal pots.

The advantages of hardening in a neutral salt bath can be further enhanced by use of an isothermal salt bath quench (martempering or austempering) to hold distortion to a minimum and eliminate quench cracking.

For more information on AJAX Electric Salt Bath Furnaces and their many uses — hardening, annealing, brazing, tempering, cleaning, quenching, etc. — metallurgists and metalworking executives are invited to write on their firm's letterhead for the new 72-page Booklet No. 116.

AJAX ELECTRIC COMPANY, INC.

Frankford Ave. at Delaware Ave., Philadelphia 23, Pa.

The World's Largest Manufacturer of Electric Heat Treating Furnaces Exclusively!

Associate Companies: Ajax Metal Co. Ajax Engineering Corp.
Ajax Electric Furnace Corp. Ajax Electrothermic Corp.
In Canada: Canadian General Electric Co., Ltd., Toronto, Ont.

AJAX ELECTRIC SALT BATH FURNACES

deal about pensions during the next 12 months, despite the overwhelming defeat of the proposed Ford pension which was first approved enthusiastically by union executives and then turned down by the workers by a vote of more than 3 to 1.

When pension drives, calls for government intervention in the steel supply situation, union politicking and propagandizing of the membership are all mixed up together in the UAW-CIO press releases, it is small wonder that the average Detroiter is thoroughly confused by the present labor situation in the automobile industry.

A DEVELOPMENT many automotive engineers have been anticipating for some time—the tubeless tire—may come fast during 1948.

B. F. Goodrich Co. has announced that a new casing which does not require a tube will probably be placed on the market before the year's end.

No inner tube is required in the new tire which also has self-sealing properties that is said to make it as nearly puncture-proof as the present so-called "puncture-proof" models. From an appearance standpoint the new tires are no different from the present casing. The tire is applied to the regular tire rim and a special "bead" treatment assures satisfactory contact with the rim. Air pressure is about the same as for normal low pressure tires and the valve stem is inserted through the rim in the customary manner. According to manufacturers, the new tire has been especially designed for high speed and is said to possess greater ability to dissipate heat than the conventional tire.

Cost of the new tires is expected to be in approximately the same range as the present white sidewall tires.

THIS week members of the press who were willing to keep their information to themselves were given the opportunity to see the new Hudson for the first time. A picture of one model of the new Hudson line was all that was made available for the present and a general public announcement is not being made until early in December after all dealers have had an opportunity to see the new model. Estimated production of the new cars which started several weeks ago is about 50 units up at the present time.

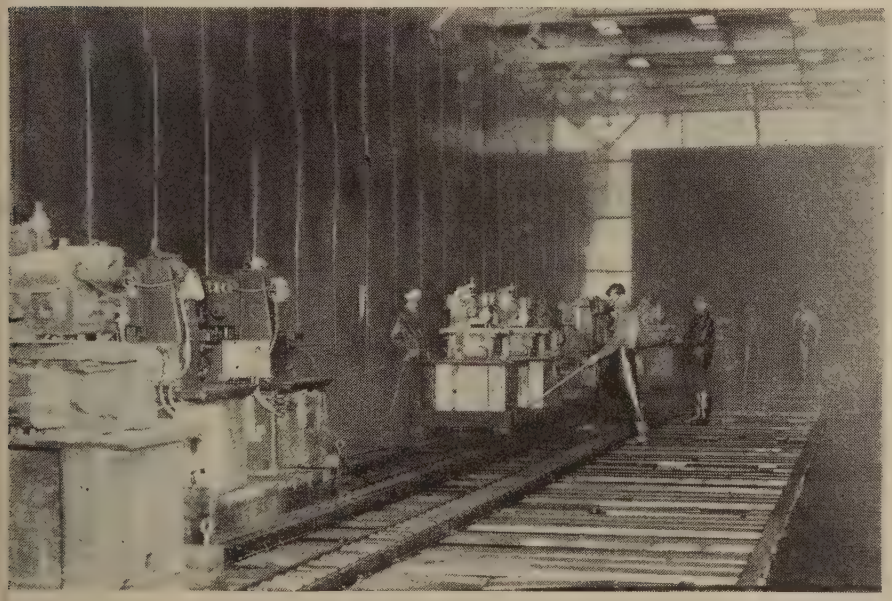
It is expected that the number of Hudson assemblies will be stepped up rapidly as crews are trained to build the new integral-type body which is featured in the cars. During the changeover period all Hudson foremen and supervisory workers remained on the job. Of the total reconversion cost estimated at $16 million a considerable part was spent for new tooling and machines.

It is reported that present production is to be confined to 8-cylinder models only. The new 6-cylinder Hudson powerplant is reported to have many unusual features not incorporated in present automobile engines. Production of the 6-cylinder engine may not begin until early in 1948.

The Ford airport is being closed to provide additional space for company engineering operations and to permit the company to base its aircraft at a field equipped with modern radio range and traffic control facilities. It is reported that the need for modern lighting and longer runways prompted the decision to abandon the present airport which is being used by Ford as a proving ground for new 1948 models. The Ford Airport was built by Henry Ford in 1924. The first Ford Trimotor plane was completed November 1925. More than 200 planes were built in an assembly line which was located in what is now the Ford body engineering building. The Trimotor was discontinued in 1933. Shortly thereafter Ford built a mooring mast which was later used for the ill-fated ZR-3, renamed the Los Angeles by the U. S. Navy. It will be recalled that the Shenandoah which would have been the first lighter-than-air ship to use the $500,000 mooring mast crashed in Ohio during a storm enroute to Detroit. For many years the Ford National Air Tours, sponsored by Henry and Edsel Ford, brought top-flight aviators to Ford airport.

Thus, Ford's venture into the aircraft field comes officially to a close nearly 25 years after the elder Ford's first enthusiastic entry into the aircraft field. Ford's pioneer work in the use of radio airway range station, the first demonstration of a radio range flight (from Dearborn to Wright Field, Dayton) and the establishment of regularly scheduled air transport flights are generally conceded to be important landmarks in the history and development of aviation in this country.

INSIDE JOB: *Production line technique is being used at the former Bell bomber plant, Marietta, Ga., to pressure clean the surplus machines which have been selected for preservation and storage by the air material command. It is estimated by Allied Packaging Co. of Cleveland, who has the contract to process the $200 million of such equipment, that it will take 2 yr to complete the program.*



Washington . . . EUGENE J. HARDY

• Commerce Secretary Harriman orders steel demand study . . . Census steel inventory report convincing factor . . . Historical steel study sidetracked . . . Top experts prepared Krug report . . . Fair Labor Standards Act studied.

WASHINGTON — The Commerce Dept. has finally begun its study of the long-term demand for steel products and the related question of the adequacy of industry capacity. As forecast by THE IRON AGE (June 26, p. 74) the study will be "a policy job, bearing the stamp of the department," since it was undertaken only a few weeks ago on direct orders from Commerce Secretary W. Averell Harriman.

Actively directing the work is R. M. Weidenhammer, chief of the department's Div. of Machinery and Metals, who is also in charge of the historical study of the iron and steel industry which has been in the works for more than a year. While it was feared that Mr. Weidenhammer might have to be discharged as a result of the Civil Service Commission order directing government agencies to replace temporary employees with laid-off career workers, Commerce has managed to stave off this order temporarily in this specific instance.

Mr. Weidenhammer has been given a lease on life extending to Jan. 1. However, this short a period will not enable him to finish either of the projects concerning the iron and steel industry. The new demand and capacity study will take at least 6 months to complete and the historical study has been sidetracked to some extent by the new project.

The background on the new study runs something like this: As is well known, Commerce has been besieged for some months by important steel-consuming industries to undertake such a project. This fact, along with steel industry comments to the effect that existing and planned capacity would be sufficient for long-term needs and the heavy European demands presented by the Marshall Plan conferees, built up additional pressure.

THE survey of steel inventories made by the Census Bureau for Secretary Harriman (THE IRON AGE, Oct. 16, p. 179) which showed that manufacturing concerns consumed 97 pct of the steel they received during the first quarter of this year convinced the Secretary that a long-term demand study should be made.

While the project was given official sanction early in October, it would be stretching the truth to say that it is well under way. Conferences have been held with the steel industry, consuming industries, and the various economists who have made studies of the capacity problem. Several field inquiries have also been made. However, this new project is competing with the Marshall Plan studies for the time of Mr. Weidenhammer and his staff. In fact, the demand study is closely tied in with the European aid program since the amount of steel to be shipped to Europe will greatly affect the domestic outlook.

AS to the historical study, it is hoped that it will be completed around the first of the year, but this is doubtful for several reasons. First, the industry review of the various chapters is taking longer than had been anticipated and, even more important, it has been temporarily shelved to the extent that the demand study and Marshall Plan work have been given precedence.

The following chapters of the historical study have been completed and are now being reviewed by the industry: Historical development of the industry up to 1901; government and the industry in World War I and II; iron ore; coal and coke; locational factors; and technology of production of iron and steel.

Ready for distribution to the industry are the chapters covering: Growth of 13 largest producers and present status of industry; alloying and coating materials; and finance. Still to be completed are the chapters on: Importance of the industry to the domestic economy; scrap; economics of production of iron and steel; consumption; and recent developments.

* * *

REPRESENTING the government in the preparation of the iron and steel sections of the Krug report on national resources (THE IRON AGE, Oct. 23, p. 72) were the top steel specialists from a handful of agencies.

Chairman of this group was Mr. Weidenhammer, who seems to have a hand in every iron and steel activity in the nation's capital, assisted by Jacob Levin, who is also working on the Commerce historical study.

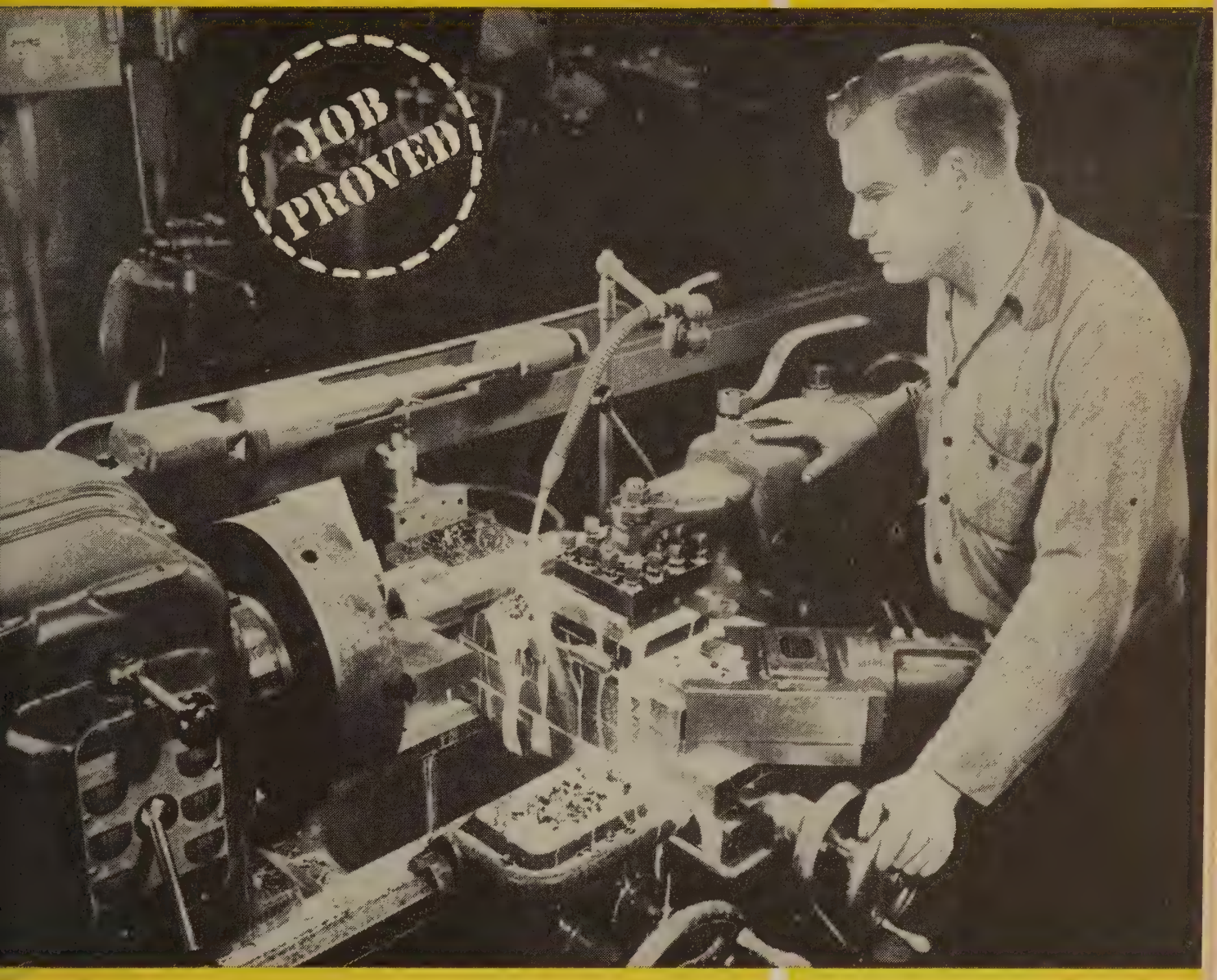
Also included were Louis H. Bean, special assistant to the Secretary of Agriculture, well known to the industry for his report on steel capacity (THE IRON AGE, June 5, p. 96) in which he stated that capacity would have to be increased by 20 million tons by 1950 in order to maintain full employment.

For the Dept. of Interior, Elmer Pehrson, widely-known chief of the Bureau of Mines economic and statistical setup, and mineral economist Norwood Melcher played a large part in the project.

CARLYLE STRAND, Tariff Commission iron and steel specialist, best known for his comprehensive report on the industry prepared for the House Ways and Means (THE IRON AGE, Apr. 4, 1946, p. 96) represented this important agency.

The Federal Trade Commission provided the services of chief economist John Blair and Earl Graham, who have been directing FTC's steel industry study. This study has not

Turning S.A.E. 4145 Annealed . . . 315 S.F.P.M.



SUNOCO EMULSIFYING CUTTING OIL

Cools and Lubricates Carbide Tool Removing approximately 23 Cubic Inches of Metal per Minute

Here are the facts on a typical job where Sunoco Emulsifying Cutting Oil makes possible heavy cuts on annealed 4145 steel.

- **Operation:** Turning 4½" shaft and removing approximately 23 cu. in. of metal per minute
- **Machine:** 16" x 54" "AMERICAN" Pacemaker multi-production lathe
- **Material:** S.A.E. 4145 annealed steel
- **Spindle Speed:** 280 R.P.M.
- **Depth of Cut:** ⅜"
- **Cutting Speed:** 315 S.F.P.M.
- **Feed:** .017"
- **Type of Tool:** Cemented carbide
- **Cutting Lubricant:** 1 part Sunoco to 20 parts water

Sunoco Emulsifying Cutting Oil forms a stable emulsion when mixed with water. Its lubricating and cooling qualities make it particularly efficient for precision work at high speeds.

For more production . . . better finish . . . longer tool life . . . call your Sun Cutting Oil Engineer or write Department IA-10.

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SUNOCO
INDUSTRIAL PRODUCTS

SUN OIL COMPANY • ***Philadelphia 3, Pa.***
In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

been abandoned but the progress is slow and no date has been set for issuance.

Completing the staff were Isaiah Frank, of the State Dept.'s International Resources Div., and Wilbert Fritz, Budget Bureau fiscal analyst.

MEMBERS of a subcommittee of the House Labor Committee are listening sympathetically to suggestions that amendments be added to the Fair Labor Standards Act to clarify its application more fully than it does at present. The subcommittee, now in session, will continue to hear testimony until about the middle of November.

It has been proposed that application of the act should be confined to the "manufacturing, processing and mining" of goods which move in intrastate commerce. At present, the application includes employees of a firm who are "in any other manner working on such goods, or in any process or occupation necessary to the production thereof."

This is held to bring within scope of the act such employees as janitors or window washers since it can be argued that clean windows and unobstructed floors are essential to production. It can also be interpreted to include any employee whose services are not historically compensated on an hourly basis, thereby forcing a change of pay basis to the detriment of the employee.

Also under consideration by the subcommittee are proposals for an amendment which would specifically exempt: (1) Those paid $75 or more a week, $325 or more a month, or $3900 or more a year; (2) anyone (rather than "outside salesman" as it now stands) whose work requires that a greater portion of the time be spent outside the plant or office; and (3) workers covered by collective bargaining agreements entered into between a recognized union and management.

THIS latter proposal is based on the fact that the act provides inflexible procedure, particularly in setting minimum hours, whereas some industries have historically required a greater number of hours as the "customary" workday or "workweek" than those permitted by law. Its sponsors contend that these are matters to be settled by employer and union, or by the state, rather than by national statute.

In addition to the congressional hearing, the Dept. of Labor has scheduled a hearing in Washington, opening Dec. 2, to consider possible revisions of the act pertaining to white collar workers. Under this classification are those who perform executive, administrative, professional, outside and "local" selling or retailing types of work.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YEH, I'M STAYIN' IN--YOU GET A PENSION WHEN YOU'RE THROUGH!
SEE THIS? IT'S FROM SAN JUAN HILL--MY HORSE IS STILL THERE!
WHY IS IT TH' MINUTE A GUY GITS INTO A WHITE COLLAR HE LIKES TO LET PEOPLE KNOW IT WASN'T ALWAYS A WHITE ONE?
YEH, BUT THEY DON'T LIKE YOU DOIN' IT! ONCE I SEZ, "SEE THIS LOOSE DEWLAP? IT WAS THREE CHINS ONCE!" IT MADE HIM SORE!
T. M. REG. U. S. PAT. OFF.
THE "I WAS THERE" COMPLEX
10-31
J.R.WILLIAMS
COPR. 1947 BY NEA SERVICE, INC.

Secretary Krug Says Mining Industry Has 200,000 Tons Scrap

Washington

• • • **Interior Secretary Krug** last week estimated that the nation's mining industries can supply steel producers with 200,000 tons of iron and steel scrap this winter and called upon 40 officers of mining associations for "full cooperation" in the new drive.

The Bureau of Mines believes that large tonnages of scrap have been accumulated in and around mines and quarries and have not been returned to consuming markets, Mr. Krug said. This untapped source, he added, includes some of the largest and heaviest pieces of equipment used in industry — power shovels, hoists, locomotives, rails, mine cars, and tools of various types.

Mr. Krug said that letters emphasizing the need for cooperation in every segment of the mining industry in the drive have been sent to 40 officers of mining associations throughout the United States. Among the mining operations included in this group are gold, silver, iron, copper, zinc, lead and other metal mines, anthracite and bituminous coal mines and such nonmetal operations as gypsum, limestone, aluminum, magnesium, sulfur, potash, salt and fluorspar mines, Bureau of Mines officials stated.

Organizes Reserve Units

Washington

• • • **Two more railroads** have signed affiliation agreements to organize military reserve units for training under the industrial preparedness program, the Army announces.

Latest to join in the reserve training program were: The Southern Pacific which will organize three railway transportation and operating units and the Louisville & Nashville Railway, one operating battalion.

Makes it doggone easy to grind LONG WORK

The problems involved in grinding holes in the end of a shaft often make production men lead a dog's life. Now, with the Bryant No. 112-M these problems are solved quickly and accurately. This machine is designed to finish bores up to 9 inches deep in the end of parts such as machine tool spindles, arbors, shafts, etc. The work table is arranged so that parts may be held either in the hollow work spindle and steadyrest or in a special fixture so that a spindle can be ground on its own bearings. The workhead and steadyrest have longitudinal adjustment and can be swung for grinding standard tapers (Brown & Sharpe, MMS, Morse, Jarno, etc.) up to 30° included angle. Reverse tapers up to 10° included angle can be ground.

The wheelhead can be either belt driven (standard) or direct drive for high wheel speeds.

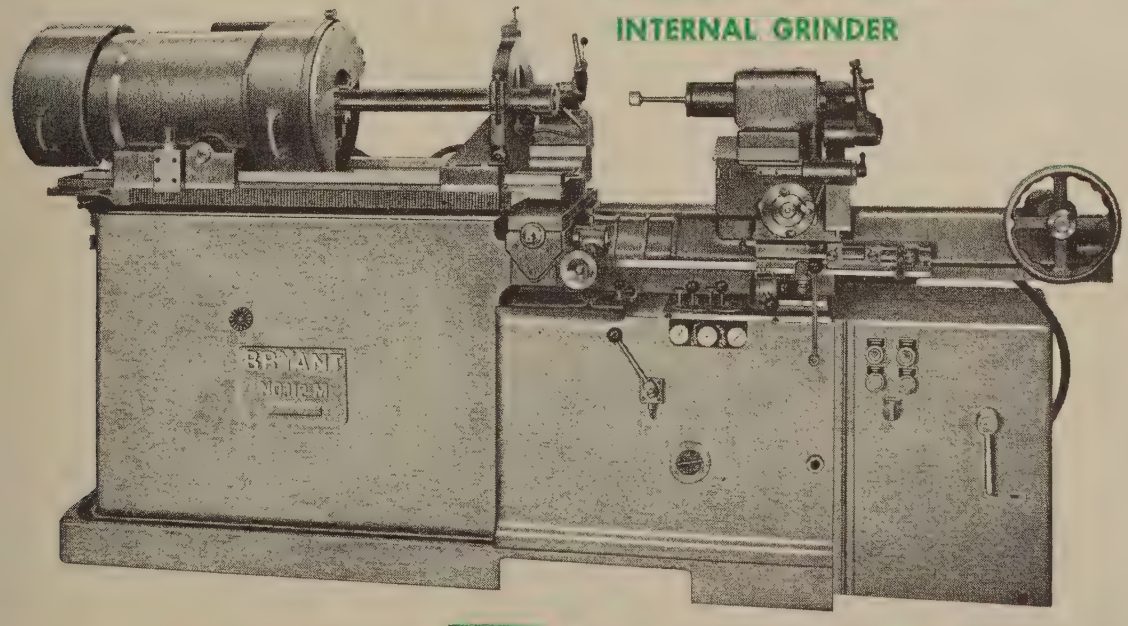
To facilitate loading and gaging, the wheelhead moves 8" to the rear. This same roller bearing slide provides cross-feed for sizing. The workhead (with 16" diameter swing) and the wheelhead are precision ball bearing construction. The axial wheelhead slide is a hardened steel bar riding on pressure lubricated bearings.

The controls include: variable speed in workhead by hydraulic motor 100 to 1,000 r.p.m.; variable rate for work and truing traverse; power cross-feed with variable rate; calibrated depth stop for facing operations; quick set reversing dogs to control position and length of wheelhead traverse.

An extra workhead is available to index 180°. This is to assure concentricity of bore at the ends of a shaft.

Write for the new Bryant No. 112-M catalog sheet which gives complete details.

NO. 112-M HYDRAULIC INTERNAL GRINDER



Send for the Man from

BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.

BRYANT

West Coast . . .

ROBERT T. REINHARDT

• Rise in prices and poor quality scrap add to West Coast steel producers' worries . . . Refractory technique discussed at ACS meet . . . Tacoma aluminum reduction plant to open.

SAN FRANCISCO—The spectre of higher production costs for steel producers stalks up and down the West Coast as the price of scrap rises under eastern influence and quality drops.

Price increases have averaged approximately $3.00 per ton for No. 1 and No. 2 heavy melting from one end of the coast to the other. However, this increase alone is not causing as much consternation as the poor quality of material being offered, according to plant operators.

Poor quality material is particularly evident in the Seattle area where, for example, one of the electric furnace operators reported that their heats have ordinarily been turned out in approximately 5 hr, and now it is not unusual to keep the melt in the furnaces for as much as 7 hours because of the need for extra slagging to reduce the sulphur content. Strangely enough, cast iron is finding its way into No. 1 heavy steel scrap and it is believed that some dealers are unloading this material because of a lower demand by local foundries. Steel producers are not complaining about the cast iron.

In San Francisco and Los Angeles similar conditions are reported and in the southern part of the state there is evidence that considerable tonnages of scrap have been going East. One estimate places the amount moving each month at approximately 7000 tons, but confirmation of this movement has not been made. However, this would seem logical in view of the price differential existing between the West Coast and eastern points and it is not unreasonable to assume that western producers are paying more for their scrap to prevent its leaving the territory.

THERE is little serious complaint about the inclusion of foreign matter in scrap in the West, although even the dealers themselves are quite willing to admit that they are having difficulties in producing clean scrap because of the inexperience and in difference of some of their newer employees. A few weeks ago several cars of scrap had to be rejected by one of the southern producers because of its foreign matter inclusions, but apparently this is the exception.

There is some optimism locally about the results to be achieved from the emergency session of the subcommittee of the Joint Industries Committee for Expediting Scrap held at Cleveland last week.

Before H. W. Christensen, director of purchases for Columbia Steel Co. here left for the meeting, he pointed out that the government controlled potential steel scrap in the San Francisco Bay area alone amounts to approximately 350,000 tons. That material, it is estimated, would be enough to assure capacity operation of the West Coast steel industry for the next 6 months.

Additional scrap is expected to develop from increased shipbreaking activities of the Kaiser interests and others and there are indications that government shipyards which have been held inactive because of a multiplicity of red tape, will be released soon for this purpose.

SALT LAKE CITY—Anti-Communist elements of the CIO International Union of Mine, Mill & Smelter Workers in this area were deeply disappointed at the failure of the national CIO convention to take some action in the interunion fight over Communistic control, or to even discuss the issue. They are left in substantially the same spot they were before the CIO appointed a special committee to investigate and report on the charges of Communist domination in the international, except that the committee did agree with the charges.

The anti-Communists were hopeful that the national CIO would force some house-cleaning in the international or provide some other place for them to go without walking out of the CIO. But the sidestepping in Boston has left them with only the three alternatives they had before: (1) to accept a leadership which they feel is disloyal to the country; (2) to remain in the union and fight for control; or (3) to secede and go independent or AFL.

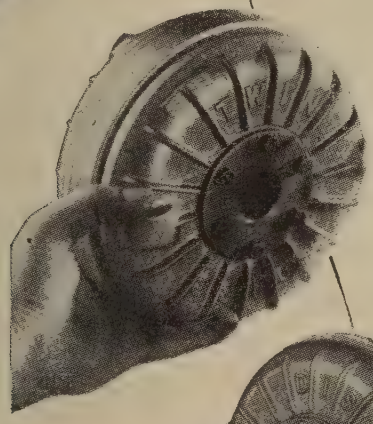
Some of the more aggressive antagonists of the international union's leadership say that the secession movement will get under way again in the near future. It was stymied earlier in the year by the appointment of the investigating committee, which led to an assumption that the top CIO leadership was going to force a showdown.

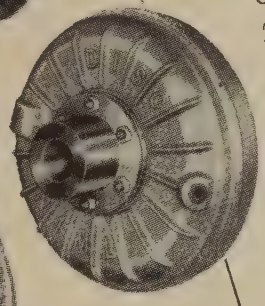
The anti-Communist forces recently won a sweet moral victory in the appointment of Dan Edwards to the state industrial commission. Mr. Edwards, formerly the representative of this district on the international union's executive board, spear-headed the abortive movement a few months ago to pull out of the international and set up an independent union of mine and smelter workers. This made him particularly obnoxious to the leftists. But both the state CIO and AFL indorsed him for the most important office in the state from the standpoint of organized labor.

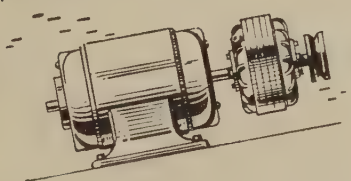
TACOMA, WASH.—Heavy consumers of electric power in the Pacific Northwest took a new lease on life as announcement was

WIDER HP RANGE

for Small Hydraulic Couplings







The horsepower range of the Twin Disc Small Hydraulic Couplings has been expanded to include capacities up to 80 hp at maximum speeds of from 2800 rpm on the largest unit to 4000 rpm on the smallest unit. Originally designed for application to internal combustion engines and electric motors in the 1 to 25 hp range at 1800 rpm, quick acceptance of the Small Hydraulic Coupling encouraged the Twin Disc Clutch Company to make it available for more widespread usage.

The Twin Disc Small Hydraulic Coupling helps overcome the inadequate torque and excessive current consumption of engines and electric motors. It also minimizes the need for complicated and expensive starting devices. Permitting delivery of full torque and preventing stalling, the use of these Small Hydraulic Couplings provides a smoother, more flexible operation. For complete information, write the Hydraulic Division for the newly published Bulletin No. 144. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

Model	Nominal Rating at 1800 rpm
7.4-SHC*	¾ — 1.5 hp
7.4-HC	2 — 3 hp
8.4-HC	5 hp
9.5-HC	7.5 — 10 hp
10.6-HC	15 — 20 hp

*Single circuit unit. All others, double circuit. For hp capacities at higher speeds, consult Hydraulic Division, Rockford, Illinois.

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

made recently that the seventh generator at Grand Coulee was soon to start producing approximately 120,000 kw.

The first major industry to take advantage of this available power is The Permanente Metals Corp. which is scheduled to resume operations of its aluminum reduction plant here Oct. 31.

This two-pot-line plant was operated during the war by Olin Industries after having been built by the government at a cost of $6 million. The facilities were sold in January of this year to the Permanente Corp. by the Defense Plant Corp. for $3 million. The new owners, who operate the Mead reduction plant and the Trentwood rolling mills near Spokane, have reportedly invested $1 million more in remodeling and rehabilitating the plant.

Most of the work preparatory to resumption of operations was completed last April but because of the power shortage in this area it was not put into production.

The unit, it is estimated, will produce approximately 3½ million lb of aluminum pig per month from the alumina produced at the Baton Rouge plant of the Permanente Corp.

All pots have been renewed and relined and machinery reconditioned and where necessary, replaced by new units.

A SPECIALLY designed scrubbing unit for the elimination of fumes covers each individual pot and is said to be the only one of its kind in use.

Complete and full production of the pot-lines is not expected for another month at least as the pot-linings and electrodes require a baking period before the reduction course can begin and this is dependent upon the delivery of electric power.

Operation of this unit will be watched closely by production-minded men who recall that the plant under the administration of Olin Industries had the reputation of being a high cost producer. It is believed by many, however, that with the improvements recently effected, reduction can be carried out there as efficiently and economically as at the Mead plant of Permanente.

It will be recalled that only last May the Reynolds Metals Co. closed down its Longview, Wash., reduction plant with the explanation that that company had a sufficient backlog of aluminum ingots and that this was an opportune time to remodel the plant. No recent reports have come from Reynolds as to the date for reopening and there is some possibility that they too will be faced with the power shortage at that plant which normally used 60,000 kw of Bonneville power.

Tucker Leases Chicago Dodge Chrysler Plant

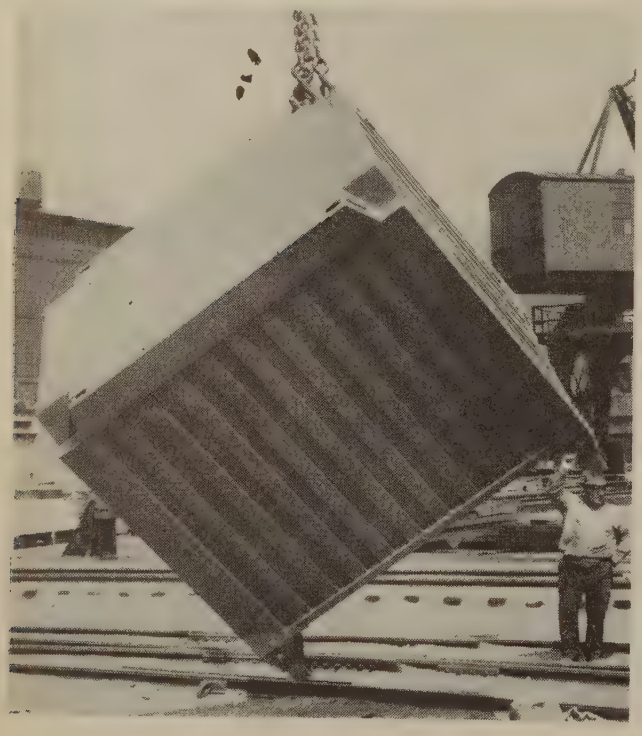
Washington

• • • **WAA has** announced that it has executed a definitive lease on the war surplus Dodge Chrysler plant, Chicago, with the Tucker Corp., Chicago.

The lease becomes effective Nov. 1, 1947. It was signed by Marshall L. Godman, WAA Deputy Administrator for Real Property Disposal, and Preston Tucker, president of the Tucker Corp.

The corporation has rented portions of the plant under an agreement signed by the WAA administrator Sept. 18, 1946, and has met all conditions stipulated by WAA.

The definitive lease is for 10 years with a minimum rental of $500,000 a year for the first 2 years and $2,400,000 a year thereafter, or 3 pct of the gross sales moving out of these premises, whichever is greater. Prior to the issuance of the definitive lease, the Tucker Corp. was to have assets of $15 million as evidence of production ability.



ACCENT ON STRENGTH: *A newly developed 276 cu ft welded steel shipping container manufactured by Dravo Corp., Pittsburgh, is here shown being tested for rugged construction. It is being lifted with a seven-ton load by just one lug inset in a roof recess.*

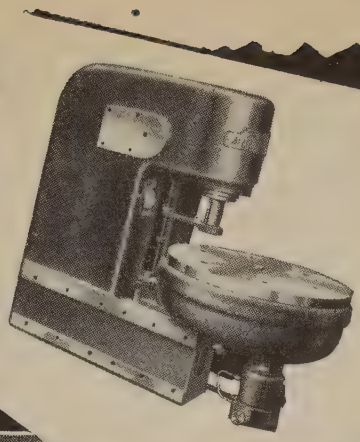
Roads Better Than Cars

Cleveland

• • • **European automobile designers** will have to develop a lot more ingenuity than they have shown to date if they ever expect to match American standards of safety and roadability, E. J. Kulas, president of the Midland Steel Products Co., said on his return from a 6-week tour of automotive plants in England and western Europe.

Expressing amazement at the general acceptance of poor riding qualities, Mr. Kulas said he found that English highways and road maintenance are far superior to our own. He pointed out that this may account for the Englishman's acceptance of cars which would not satisfy American car owners.

MULTIPRESS* INCREASES PRODUCTION Over 100% for Electrical Products Manufacturer



Precision crimping of a thin metal tube to a ceramic bushing presented quite a production problem to a large west coast electrical products manufacturer. Due to variance in part dimensions and part fragility, the operation was formerly run on a manual type press, depending on operator skill for correct pressure. Production by this method was 500 pieces per hour, with a high percentage of rejects. By the MULTIPRESS method, feeding, positioning and ejection of parts is completely automatic, requiring the operator only for loading. *Production was upped to 1100 pieces per hour and rejects greatly reduced—using an unskilled worker!*

*T. M. Reg .U. S. Pat. Off.

The Denison HydrOILic Index Table was one of the standard accessories used with the MULTIPRESS in achieving this unusual production record. This accessory is especially designed for rapid feeding of parts to the MULTIPRESS ram, for peak production on small and medium sized parts. Since the exact pre-set pressure of the MULTIPRESS remains constant, regardless of part variations, high production can be maintained *without rejects!*

MULTIPRESS used with the Index Table has been boosting production in all industries, often to figures once thought impossible to attain. After you investigate MULTIPRESS with HydrOILic Index Table, you'll see how your own production figures may well do the same! Write today for complete data!

HydrOILics — INDUSTRY'S RIGHT HAND

DENISON EQUIPMENT for APPLIED HydrOILics

THE DENISON ENGINEERING COMPANY

1158 Dublin Road • Columbus 16, Ohio

PERSONALS

o o o

• **C. E. Clarke,** general manager of the Bethlehem Steel Co.'s Steelton, Pa., plant, has been named general manager at Sparrows Point, Md., succeeding S. J. Cort. **W. B. Lang,** assistant general manager of the Steelton plant, has been appointed general manager, succeeding Mr. Clarke.

• **Ralph C. Moffitt** has been promoted to the position of assistant to vice-president-purchases of the U. S. Steel Corp. of Delaware, Pittsburgh. Mr. Moffitt joined the U. S. Steel Corp. organization in the purchasing department of the Columbia Steel Co. in San Francisco. He came to Pittsburgh in 1945 as purchasing representative to handle purchasing for Columbia Steel Co.'s expansion and reconversion programs in the far west, the position he held prior to assuming his new duties.

• **Lloyd J. Ely** will head up Caterpillar Tractor Co.'s new diesel engine factory in Peoria, Ill., which is currently under construction and is slated for occupancy and partial operation before the end of the year. Mr. Ely formerly held the position of factory manager. **John Elwood** will have charge of all diesel track type tractor production, moving up from the position of assistant factory manager. **Arthur W. Johnson,** assistant factory manager, will become factory manager in charge of the manufacture of the earthmoving products of the company.

• **Paul S. Park** has been named manager of the engineering service department of A. M. Byers Co., Pittsburgh. He has been with A. M. Byers nearly 4 years.

• **E. W. Deck,** formerly general manager of the Trent Tube Mfg. Co. at East Troy, Wis., will become manager of the Ithaca, N. Y., plant of the Morse Chain Co., a division of Borg-Warner Corp., on Nov. 15.

• **Steve J. Sferra** has been appointed superintendent of Youngstown Sheet & Tube Co.'s coupling shop, Youngstown, succeeding **Thomas C. Thomas,** retired.

• **William H. Winfield** has been named manager of the newly-established department of economic research, Monsanto Chemical Co., St. Louis.

• **John Yetter** has been appointed district sales engineer, ball and roller bearing division, Link Belt Co., with headquarters in Dallas. He joined the Link-Belt organization about 2 years ago and spent most of a year in training at the company's ball and roller bearing division plant in Indianapolis before being transferred to the southwest.

RALPH H. LUNDBERG, vice-president, Peninsular Grinding Wheel Co.

• **Ralph H. Lundberg** has been elected vice-president of Peninsular Grinding Wheel Co., Detroit. For 19 years he was a member of the engineering staff of Norton Co., Worcester, Mass.

• **William J. Kaiser** has been appointed general works manager for Commercial Controls Corp., Rochester, N. Y., and its two subsidiaries, Electromode and Justowriter Corps. Prior to his appointment, Mr. Kaiser had held the position of works manager for Commercial Controls and Electromode Corps.

• **Eugene G. Gwyer** has been appointed to the staff of engineering of the Hanson-Van Winkle-Munning Co., Matawan, N. J.

• **Byron C. Foy,** chairman of the board of Jack & Heintz Precision Industries, Inc., Cleveland, has been elected president of the company. He will also continue to serve as chairman of the board.

• **G. V. Dryden,** treasurer of the Nichols Wire & Steel Co., Davenport, Iowa, has been named chairman of the board of directors. **F. P. Leahey** has been advanced from general works manager to vice-president, and **W. J. Johnston,** from assistant treasurer to treasurer of the company.

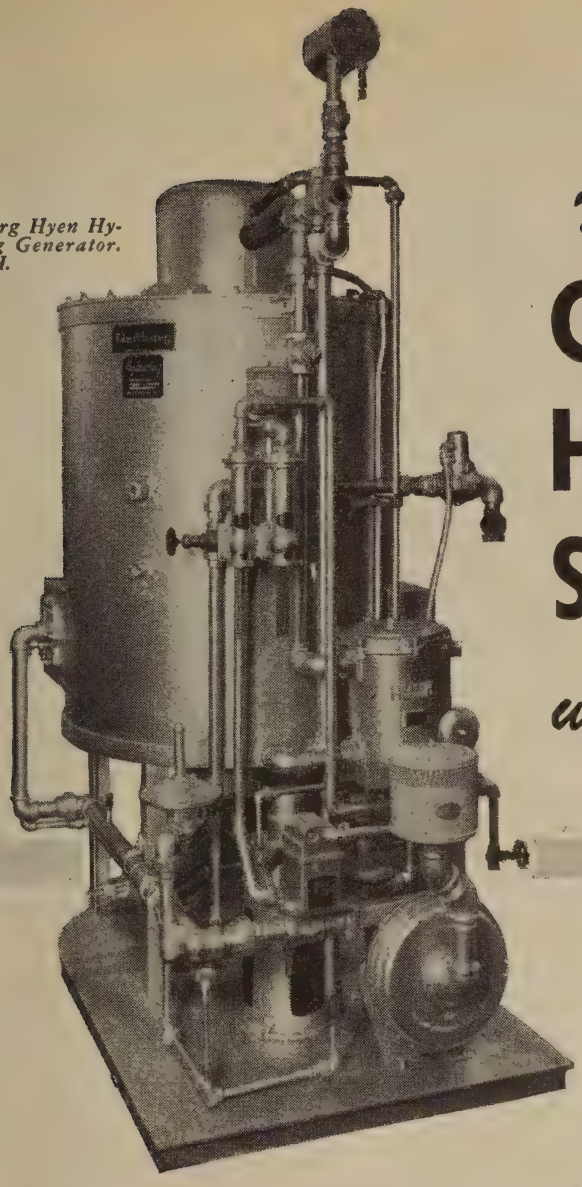
• **Patsy Qualtieri** has been appointed district manager of the Los Angeles office of Micromatic Hone Corp.

• **James D. Glenn** has resigned his position as vice-president in charge of sales of Eastern Stainless Steel Corp., Baltimore. **Robert G. Leary** has been appointed general sales manager of the corporation. Mr. Leary joined Eastern in 1936 and has served as manager of various branch offices since that time. Following his return from service in the Army, Mr. Leary has been the corporation's export and New York branch sales manager.

• **J. L. Petresky** has been appointed assistant to the president and **William F. Muth** has become sales administrator of National Bronze & Aluminum Foundry Co., Cleveland. **A. J. Mosley** has been made chief engineer. Mr. Petresky has spent 45 years in the foundry business, 25 of them with National Bronze. Mr. Muth was one of the original organizers of the company in 1911 and was secretary-treasurer of the original company.

• **Frank J. O'Brien** has been elected president; **Donald H. Bissell,** vice-president, secretary, and director; **George H. Sayers,** treasurer, and **Charles H. Belvin,** assistant secretary, of the Chromium Corp. of America, New York.

• **Frederic W. Mellor** has joined the Foundation Co., New York, as assistant to the president. He recently resigned as general sales manager of the H. K. Ferguson Co., Cleveland.

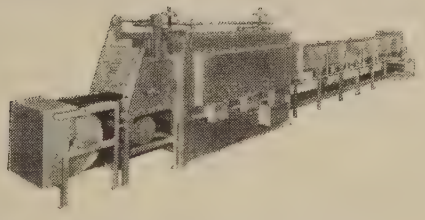


Lindberg Hyen Hydryzing Generator. 750 CFH.

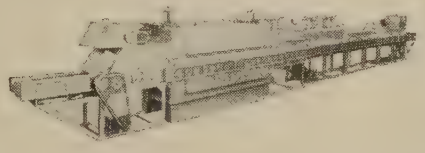
You can now

COPPER BRAZE HIGH CARBON STEEL...

without Decarburization!



Lindberg Mesh Belt Conveyor Brazing Furnace. Work chamber 20 inches wide, 8 feet deep, 10 inches high. Cooling chamber 24 feet. Work capacity: 450 to 700 gross lbs. per hour.



Lindberg Roller Hearth Conveyor Brazing Furnace. Work chamber, 18 inches wide, 9 feet deep, and 1 foot high. Cooling chamber, 36 feet. Work capacity: 750 gross lbs. per hour.

Do you have a job that calls for brazing high carbon steel parts,—without decarburization? Investigate the possibilities of Lindberg Brazing Furnaces, —with the Lindberg Hyen Hydryzing Atmosphere Generator.

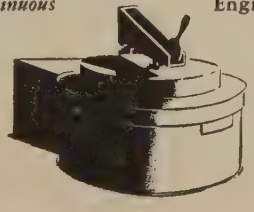
LINDBERG HYEN HYDRYZING ATMOSPHERE *eliminates decarburization.* This is possible because the HYEN generator employs a new design principle in the endothermic cracking of city, natural, propane, or butane gases. A refractory retort is used which permits much *higher cracking temperatures* than ever before used,—thus decarburizing constituents (carbon dioxide and water vapor) are eliminated.

The Hyen is a versatile as well as a precision generator,—can be set to be in equilibrium with *any* carbon content steel. Once set, atmosphere analysis remains constant, and *will not drift.*

LINDBERG BRAZING FURNACES are especially designed to prevent infiltration of air. Consequently decarburization is eliminated because furnace atmosphere is maintained with the same degree of purity at which it was generated.

Lindberg Brazing Furnaces need *never be cooled* for element maintenance. Globar elements may be replaced from *outside* the furnace.

Bulletins 190, "*Lindberg Controlled Atmospheres*"; 201 "*Lindberg All Purpose Brazing Furnaces*" and 210, "*Lindberg Continuous Production Brazing Furnaces*" are available on request. Lindberg Engineering Co., 2452 W. Hubbard St., Chicago 12, Ill.



LINDBERG FURNACES

• **Louis H. Hamilton,** president of the Dumore Co., Racine, Wis., has become chairman of the board of directors. **Robert L. Hamilton,** who has been serving as executive vice-president, has been elected president.

• **Sigmund W. Stewart** has been appointed general purchasing agent and **J. M. Menk,** assistant general purchasing agent of the Vanadium Corp. of America, with headquarters at Niagara Falls, N. Y. Mr. Stewart was formerly assistant purchasing agent of the Continental Electric Co., Inc., and Mr. Menk was works accountant of the Vanadium Corp. of America. **George W. Johnson,** formerly sales engineer, has been appointed manager, steel foundry division of the Vanadium Corp., with headquarters in Chicago.

• **William E. Simmons,** former sales manager of the truck body and hoist division of the Heil Co., Milwaukee, has been appointed general manager of that division as well as the road machinery and service departments. He will continue as sales manager of the division.

• **Norbert J. Connors** has resigned as sales promotion and advertising manager of Eastern Stainless Steel Corp., Baltimore. Mr. Connors, who joined Eastern Stainless in 1945, previously held sales positions with Sharon Steel Corp. and with Republic Steel Corp.

• **W. Ray Culp** has been appointed manager of industrial sales, Pacific Coast, for the paint division of Pittsburgh Plate Glass Co. He succeeds **R. Stanton Richter,** who will serve the West Coast area as a sales representative specializing in automobile production finishes. Associated with Pittsburgh Plate Glass Co.'s paint division since 1935, Mr. Culp has served in the company branches at Fresno, Sacramento and Oakland. He was appointed industrial sales representative in 1942, which position he held until his recent promotion. His headquarters will be at Los Angeles. Mr. Richter has been associated with Pittsburgh Plate for 27 years.

ALBERT A. RICKER, assistant to the president, Jack & Heintz Precision Industries, Inc.

• **Albert A. Ricker,** vice-president in charge of finance, has been appointed to the newly-created position of assistant to the president of Jack & Heintz Precision Industries, Inc., Cleveland. He became vice-president in charge of finance in 1946 and will retain that position while fulfilling his new duties.

• **Edward L. Warner, Jr.,** will direct public relations for Briggs Mfg. Co., Detroit, and other Detroit accounts for McCann-Erickson, Inc. Mr. Warner has been manager of the Aviation Div. of the Automotive & Aviation Parts Manufacturers, Inc.

• **B. D. Claffey,** a director and general manager of General Malleable Corp., Waukesha, Wis., has resigned to become vice-president and general manager of Acme Aluminum Industries, Dayton.

• **Harry C. Dishman** has been appointed equipment sales manager of Raybestos-Manhattan, Inc., with headquarters in Detroit. **George T. Young** has been made branch manager of the Detroit office; **E. E. Juergens,** branch manager of the Cleveland office; and **John E. Cole,** branch manager of the Chicago office. Mr. Dishman started with the Raybestos Co. in 1916 as development engineer and factory superintendent. In 1919 he was appointed branch manager of the Raybestos Co.'s Detroit branch in charge of sales and engineering, and in 1932 was named branch manager of the corporation equipment sales division, Detroit branch. Mr. Young was formerly with the Cadillac Motor Co., and entered the sales department of the Manhattan Rubber Mfg. Co. in the Detroit office in 1917. He left for service in World War I and rejoined Manhattan in 1919. With the formation of Raybestos-Manhattan, Inc., he continued in the equipment sales division of the corporation at the Detroit office. Mr. Juergens, previous to joining the equipment sales division in 1934 as eastern representative, spent 22 years in various phases of the iron and steel industry. During the past 2 years he has covered Western New York, Western Pennsylvania and Ohio. Mr. Cole joined the Raybestos-Manhattan organization in 1939 with the industrial sales division at the Cleveland office. During World War II he served with the War Production Board in Washington. Shortly after returning from Washington he became sales manager of the packing sales department of the Asbestos Textile & Packing Div. at Manheim, Pa.

• **Dr. John C. Bellamy** has been appointed associate director of Cook Research Laboratories, Chicago. He has been an assistant professor at the University of Chicago since 1941 and was a special consultant to the Army Air Forces from 1943 to 1945.

• **J. M. Clawson,** purchasing executive in the New York office of the Newport News Shipbuilding & Dry Dock Co., has retired. Mr. Clawson has been with the Newport News Shipyard for 49 years.

• **Bert C. Gamble,** chairman of the board, Western Auto Supply Co., Kansas City, has resigned, and **Lester Hutchings** has been elevated to that position, and **Paul E. Connor** has been elevated to the presidency of the company. **A. B. Flemington,** formerly vice-president in charge of buying, has been promoted to the position of vice-president in charge of merchandising, and **C. V. Knutson,** formerly assistant secretary and director of sales, has been named director of buying.

• **Robert J. Peck** has been appointed district manager of Electric Products Co.'s New York office. He joined the company in May.

• **H. A. Glover** has been appointed assistant sales manager of the S&C Electric Co., formerly Schweitzer & Conrad, Inc., Chicago. Mr. Glover joined the company as sales department supervisor in the fall of 1946.

• **Charles P. Trudell,** former sales manager for the Bell Aircraft Corp., has been appointed chief engineer of the R. G. Wright Co., Inc., of Buffalo. Mr. Trudell joined the company in September as assistant to the general manager.

• **Joseph W. Schwalbach** has been named purchasing agent of the Barcalo Mfg. Co., Buffalo, to succeed **George D. Rutherford,** who is retiring after 44 years with the company. Mr. Schwalbach has been assistant purchasing agent since January.

• **William R. Elias** has been named sales and service representative in the Buffalo district for the Industrial & Marine Equipment Corp.

• **P. W. Stansfield** has been named manager of passenger car tire sales of the replacement tire sales division, B. F. Goodrich Co., Akron, Ohio. He joined B. F. Goodrich in 1936, and for the last 8 years has headed the retail sale of farm tires.

• **Allan O'Neal,** with the B. F. Goodrich Co. since 1929, has been named manager of the company's plant in Clarksville, Tenn. He succeeds **C. R. Spencer,** resigned.

• **A. F. Preuster,** sales and service representative of the eastern states territory for the International Graphite & Electrode Corp. of Niagara Falls, N. Y., and St. Marys, Pa., has retired after 17 years of service and will be replaced by **Charles A. Gierach.** Mr. Gierach served for several years with the American Manganese Steel Div. of the American Brake Shoe Co.

• **John E. Payne,** formerly manager of industrial sales, has been named manager of all industry sales departments for the Westinghouse Electric Corp., with general overall responsibility for sales of equipment to all industries. **R. S. Kersh,** who has been manager of the company's Houston office since 1942, has been named manager of industrial sales to succeed Mr. Payne. Both men will be located at the Westinghouse East Pittsburgh plant.

• **Louis W. Rasor** has been appointed district sales manager of Goodyear Tire & Rubber Co.'s mechanical goods division, at Charlotte, N. C. He succeeds **Richard G. Abbott,** who becomes district manager at Los Angeles. Mr. Rasor was the company's mechanical goods representative in Toledo.

• **V. R. Billings** has been appointed to the position of advertising and sales promotion manager for the industrial materials handling department of Conco Engineering Works, Mendota, Ill. For the past 2 years Mr. Billings served as sales engineer of materials handling equipment for Consolidated Sales Co.

• **A. J. Schaab** has been appointed assistant general freight agent, Chicago, of the Santa Fe Ry. Mr. Schaab first entered Santa Fe service in 1919, in a clerical position in the operating department. In April of this year he was given the title of acting assistant general freight agent, Chicago, from which position he was promoted to his present appointment.

• **Murray H. Owen** has been appointed manager of sales of the General Electric Co.'s wire and cable division, Bridgeport, Conn. Mr. Owen's new position includes his old duties as manager of sales of the York wire and cable section as well as the duties of **A. E. Newman,** formerly manager of sales of the Bridgeport wire and cable section, who has retired. **D. M. Daley** has been appointed representative for General Electric tungar and metallic rectifiers in the Great Lakes district, Cleveland. Mr. Daley joined the General Electric Supply Corp. in 1939 as a supply salesman. Following service in the U. S. Army, he was appointed branch manager for GESCO in Kalamazoo, Mich.

• **R. S. Neblett,** manager for the past 2 years of the federal and marine divisions, General Electric Co., Schenectady, has been named administrator of the company's nucleonics project. **Bruce R. Prentice,** who has been serving as staff assistant to Mr. Winne on nucleonics project work, has been made Mr. Neblett's assistant.

• **Walter J. Hogan** has joined the staff of the Roll Formed Products Co., Youngstown. He had formerly been associated with the Van Huffel Tube Corp. and also United Tube Corp.

...OBITUARY...

• **Harry N. Lutz,** one of the founders, and a member of the board of directors, of the Edgcomb Steel Co., Philadelphia, died Oct. 4 after a long illness.

• **B. F. Courtright,** 62, vice-president and manager of sales, Wisconsin Steel Co., Chicago, died suddenly Oct. 15. Mr. Courtright has been associated with Wisconsin Steel since 1908.

• **Howard H. Barrows,** 63, associated with General Electric Co., Schenectady, since 1908, died Oct. 12. He had retired Jan. 1 of this year.

• **Leslie A. Goff,** 53, equipment engineer at the Norton Co., Worcester, Mass., died Oct. 9.

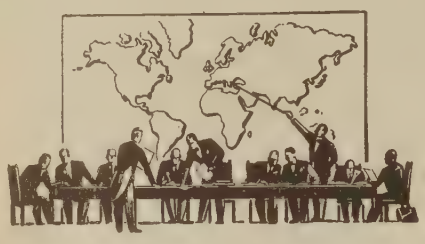
• **Harry J. Veldwyk,** 63, owner of the Veldwyk Machinery Co., Seattle, died Oct. 14.

• **Charles H. Krebs,** 67, superintendent of the Queen City Foundry & Machine Co., Buffalo, since 1913, died Oct. 14.

• **George L. Conklin,** 58, purchasing agent of the Sterling Engine Co., Buffalo, died Oct. 12.

European Letter . . .

• Attlee's government at half-time of the present Parliament cannot be deemed a good government . . . However, it is best that the education of the Labor Party should continue.



LONDON—The second session of the present Parliament has ended and the third session has begun. This is the Labor government's and the Labor Parliament's watershed. Parliaments sometimes run to five sessions, but not often, and there are plenty of voices willing to prophesy that this particular Parliament will not even see its fourth. This, then, so far as can be foreseen, is half-time.

How, at this dividing-point of its career, does the Labor government stand? What is the score at half-time? Not by any stretch of language can Mr. Attlee's government, to judge by its record so far, be deemed a good government. If judgment was still suspended at the end of the first session, it was crystallizing at the end of the second.

It is true that the Labor Party has yet to lose a by-election; but that, is a more of less fortuitous circumstance, and the by-election figures, when properly analyzed, have recently begun to show a decided turn against the government. What put Labor in, 2 years ago was the large number of middle-class votes that they got. But the middle class, to judge by the admittedly scanty pieces of evidence that are available, have turned against them.

What is even more significant is that the young people have also turned against them; the Cambridge Union's refusal of confidence to a Labor government, by a vote of more than 5 to 2 and against the advocacy of Mr. Strachey, is almost inconceivable to those who knew the undergraduates of the interwar years.

THE defects of the government have, indeed, become painfully clear in recent months. The most crying defect is the low caliber of the men who hold office. Some, but a very few, of the present Ministers would challenge comparison with the best that other governments have contained. But the average level of competence and courage is very low; and Mr. Attlee's recent changes, though they were improvements, have served only to emphasize how many incompetents he is apparently compelled to leave untouched.

Mediocre individuals can nevertheless sometimes make a good team, if they are well led and act together. But the present Cabinet have little leadership and, if reports are to be believed, they suffer from an unusual number of personal vendettas.

Their second defect is that they have squandered even such resources of talent as they possessed. They have diverted the attention of Parliament, of their official advisers and of public opinion to a grandiose program of legislation which is now seen to be not so much bad as utterly irrelevant to the nation's needs.

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In what particular, however small, can the Nationalization Acts be said to have helped the country to weather the gigantic storm that is now brewing? The storm was long predicted; Ministers have had the most ample warning; yet when its first icy gust blew in the windows of the Cabinet room last February, it found Ministers playing tiddleywinks.

THESE are hard words. But politics is the art of the possible, and he who would condemn a group of politicians for their misuse of power must first convince himself that a more effective grouping was possible.

Given the fact that the electors wanted to put a Labor government into office in 1945, could it reasonably have been expected to do better? And given the addiction of the Labor Party to the more sentimental aspects of Socialism, given the vast inertia of the trade unions, the answer can only be no. Could a Tory government, if the narrow electoral margin had fallen the other way, have done any better? The answer is less certain, but it is also probably no.

The Conservatives might have done better in some things. They would not have distracted attention so completely from the real issues. They might have seen trouble coming a little earlier. They might even have found the courage to act a little earlier and a little more decisively. But against this a Conservative government would, deservedly and undeservedly, have had to face much more social and industrial unrest.

It is very difficult to believe that, had the crucial 2 millions voted the other way in 1945, the position of the country would have been substantially different today. For what is happening is not the crisis of a single party or of a single creed, to be cured by the application of another party and another creed, but the crisis of a whole political and social system, the crisis of a whole nation which has to shake itself out of habits of sloth for which the Tories are as responsible as the Socialists, the FBI as much as the TUC.

It is said that a people always gets the government it deserves, and it would be hypocritical, as well as uncharitable, to blame Mr. Attlee and his colleagues for so faithfully reflecting the British people in their cardinal misjudgment of the situation that existed in 1945 and in their obstinate refusal to admit that life is very much harder than they hoped it would be.

SO, although the Labor government has done far from well, it will turn out to be a good thing that it has been there these past 2 years. And, by the same token, it is better that it should stay in office

than that any of the possible alternatives should be followed.

A coalition would merely be a dilution of responsibility and would still further diminish and retard the government's power of decision. A general election, followed by a Conservative government, would be resented as a repetition of the trick of 1931 and be used by the Labor Party ever afterwards as an all-embracing alibi.

If there were, waiting in the wings, an alternative government, equipped with a clear and contrasting policy which would certainly be better, if the return of a Conservative government would alter any of the fundamental factors in the national crisis, if it would mine more coal or sell more exports or secure more dollars — it might then be right to snatch at the immediate advantage.

But doubts hang over all these things, and the present government is slowly being forced into doing the only thing a Conservative government could do at once—that is, initiate a sharp bout of disinflation.

And while the advantages of a change are problematical, there is one great advantage to be derived from the Labor Party remaining in office. If they go on as they have been going, they will be soundly beaten at the next election. But that will not finish the Labor Party; it will continue to govern the country, in alternation with the Conservatives, for a long time to come.

That being so, the more it has its nose held down to the grindstone of factual reality, the more sentimental nonsense is squeezed out of its beliefs, the more ideological delusions it is compelled to abandon, the better for everybody.

Canadian Pig Iron August Production 72.9 Pct Capacity

Toronto

• • • **Canadian pig iron** production in August amounted to 166,878 net tons or 72.9 pct of total rated capacity compared with 157,153 tons in July, or 68.7 pct, and with 46,153 tons in August last year, when two of Canada's major producers were closed by labor strikes. Output for the month under review included 133,827 tons of basic iron, of which 122,780 tons were for further use of producing firms and 11,047 tons for sale; 19,806 tons of foundry iron with 317 tons for further use and 19,489 tons for sale, and 13,245 tons of malleable iron, all for sale.

In August one additional blast furnace was blown in, making 12 furnaces blowing out of a total of 14 in Canada. Blast furnace charges in August included 320,779 tons of iron ore; 11,945 tons of mill cinder, scale, sinter, etc., and 6,398 tons of scrap iron and steel.

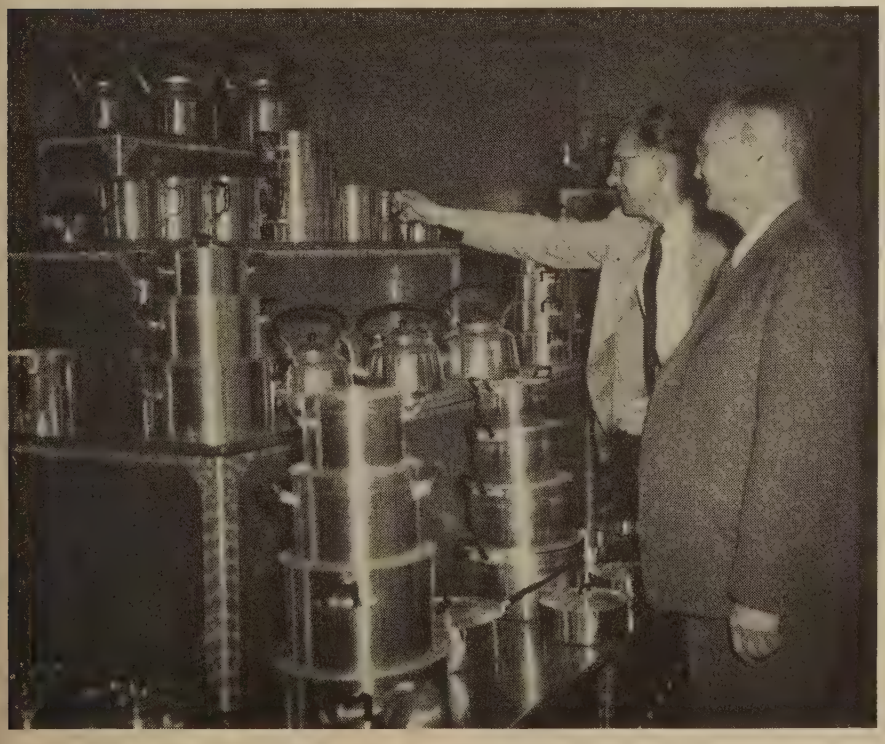
For the eight months ending with August, pig iron output in Canada totaled 1,949,376 net tons, compared with 1,674,282 tons in the corresponding period last year and with 2,049,707 tons in the 1945 period.

Production of ferro-alloys in August amounted to 11,398 net tons, against 12,402 tons in July and 6,013 tons in August, 1946. For the month under review output included by tonnage, ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrome-x and ferrophosphorus. For the first eight months this year, production of ferro-alloys totaled 101,550 net tons, against 81,247 in 1946 and 130,090 tons in 1945.

Following are comparative monthly production figures for 1947 in net tons:

	Pig Iron	Ferro-Alloys
January	177,313	9,644
February	150,632	9,357
March	164,403	14,197
April	160,749	13,015
May	160,230	15,325
June	159,826	16,212
July	157,153	12,102
August	166,878	11,398
Total	1,297,184	101,550

FROM PLANES TO PANS: *At the Export Fair in Hanover the salesman (right) shows a Swiss buyer his stock of aluminum utensils. The use of aluminum for pots and pans is not new. The accent here is on design.*



CNR Spends $100 Million

Montreal

• • • **Expenditures by the** Canadian National Railways this year for materials and supplies will total almost $100 million, according to R. C. Vaughan, president, who said that if materials and labor had been available, CNR purchases would have been still higher. He stated that orders for rolling stock already placed total $40 million, and the company has been trying to increase its orders, but rolling stock builders are plugged with orders and are unable to quote.

In view of this condition, he stated, it was decided to rehabilitate and remodel locomotives and car equipment, and an estimated $24 million will be spent this year on this program, bringing total expenditures on rolling stock to $64 million.

Industrial News Summary...

- **Scrap Markets Stay Strong**
- **Consumers Now on Sideline**
- **Free Market Scrap Is Thin**

TEMPORARILY, at least, the reluctance of large consumers to go overboard on current prices has slowed up the rambunctious scrap market this week. Whether or not this wholesale exodus of consumers from local markets will be able to depress scrap prices remains to be seen.

Scrap brokers throughout the country were having some difficulty in covering orders taken at high prices last week, let alone covering a small amount of sales at "technically" lower quotations this week. Consumer efforts to depress the price of local scrap are being rapidly offset by importation of substantially greater amounts from out-of-district areas. At Pittsburgh, this latest market trend is adequately pictured by the purchase of a small amount of scrap at a lower price, while scrap being delivered to the Pittsburgh district from the East and Southwest is commanding prices as high as, if not higher than, delivered prices of a week ago.

Because of a wide variety of factors in the current markets at Pittsburgh, Chicago and Philadelphia, THE IRON AGE scrap price composite this week is up 75¢ a ton to a new historical record of $42.58 a gross ton. The advance was considerably less than has occurred during the past 2 weeks and some sources are certain that the upward spiral has been arrested. This view, however, is not uniformally held in scrap circles. Efforts to lower local scrap prices have backfired in the past as consumers stepped up their out-of-district purchases.

Out-of-district activity has been highlighted this week by higher quotations at Boston, where the average price of heavy melting steel is up $3 a ton from a week ago, and at New York where the average advance has been $2 a ton. Activity has also picked up in the southwest, and transactions immediately bordering major consuming districts have also quickened.

MOST steel officials are privately worried over the gyrations of the scrap market but just as candidly recognize that a free market such as scrap can only be controlled by the law of supply and demand, unless the government steps in with price ceilings. The latter course is hardly likely for the simple reason that a price ceiling on scrap might possibly indicate a concurrent ceiling of steel prices—something that steel companies would fight to the last ditch.

Major scrap consumers have found that No. 1 heavy melting steel—a prime grade—has almost disappeared from some markets under that name. Considerable tonnages of industrial scrap and various types of low phos grades are moving at premium prices when compared with heavy melting quotations. This overgrading is bound to be common in a market like the present one.

Another disturbing factor in the scrap market is the certain knowledge that some time in 1948 the Marshall Plan will call for about 2 million tons of scrap to be exported from this country to Europe. This influence on the eastern scrap markets is similar to that exerted on the grain markets by government purchases.

Of more immediate importance to steelmakers is the small amount of free scrap on which national quotations are based. Steel producers have bypassed scrap brokers to a serious extent since the war ended. Scrap material from manufacturing plants which used to pass through dealers and brokers and be a stabilizing influence on the free market is now earmarked for steel companies and shipped direct to their plants.

This situation has made the total supply of dealer and broker scrap exceedingly thin compared with the total scrap shipped into steel plants. Most of the earmarked scrap which is returned by steel company customers to the steel plants is usually priced on the basis of current quotations on the free scrap market.

This condition has been further aggravated by the ease with which representatives of those companies who are selling large quantities of ingots for conversion purposes bid high prices on markets throughout the country. In the past year there have been several instances where wide variations in the scrap market prices have been a direct result of an expansion in steel conversion activity.

The national ingot rate this week is unchanged at 97 pct of rated capacity. It is problematical whether this rate can be exceeded. Pig iron output is still suffering from poor quality coke and necessary repairs. The long term tight position on scrap has not changed for the better.

THE whole future of the steel price-wage situation will probably have to await the outcome of the special session of Congress. Attempts may be made to do something about basic prices by some kind of government action. But it is hardly likely that rigid controls can be reinstated now. Future action on steel prices must await the trend of scrap prices, the outlook for industrial wages, and action, if any, by the government on the broad price front. If the scrap market should stage a complete runaway some steel companies will be forced to take immediate action on the prices of their products.

With a flurry of publicity, two primary producers recently announced price decreases on aluminum sheet products. Now only 2 months later Reynolds Metals Co. has put into effect without any publicity price increases on these products of 1¢ to 2¢ per lb. In one or two instances the new prices are slightly higher than the original prices from which the reductions were taken.

• **NEW DEAL**—Kaiser interests are reported dickering for the American Steel Foundries war time plant in Indiana Harbor, Ind., now owned by WAA. Kaiser, it is understood, would like to get this plant which he plans to use for the manufacture of stampings and the casting of engine blocks.

• **U. S. STEEL EARNINGS**—U. S. Steel in the third quarter of this year reports a net income of $28,735,082 compared with $29,336,868 in the second quarter. Third quarter earnings per share were $2.58. Earnings per share for the first 9 months of 1947 were $9.01 compared with $4.43 for the same 1946 period. Steel ingot operations in the third quarter were 90.2 pct of capacity compared with 98.1 pct in the second quarter. Third quarter shipments were 4,808,277 net tons. Strikes affected the third quarter operations. Shipments in the first 9 months of 1947 were 14,940,667 compared with 10,345,010 in the same 1946 period. Earnings in the 9 months of this year were $97,306,461 compared with $57,467,894 in the same 1946 period.

• **FREIGHT CAR RUMORS DENIED**—Rumors that ODT would ask for legislation providing that agency with allocation powers and inventory controls over steel in order to whip the freight car shortage were flatly denied this week by ODT Administrator J. Monroe Johnson. He told THE IRON AGE that he felt the power now held by the recently created task committee of steel producers, car builders and railway officials (THE IRON AGE, Oct. 23, p. 101.) is adequate for drawing up a program to meet the 10,000 car monthly goal.

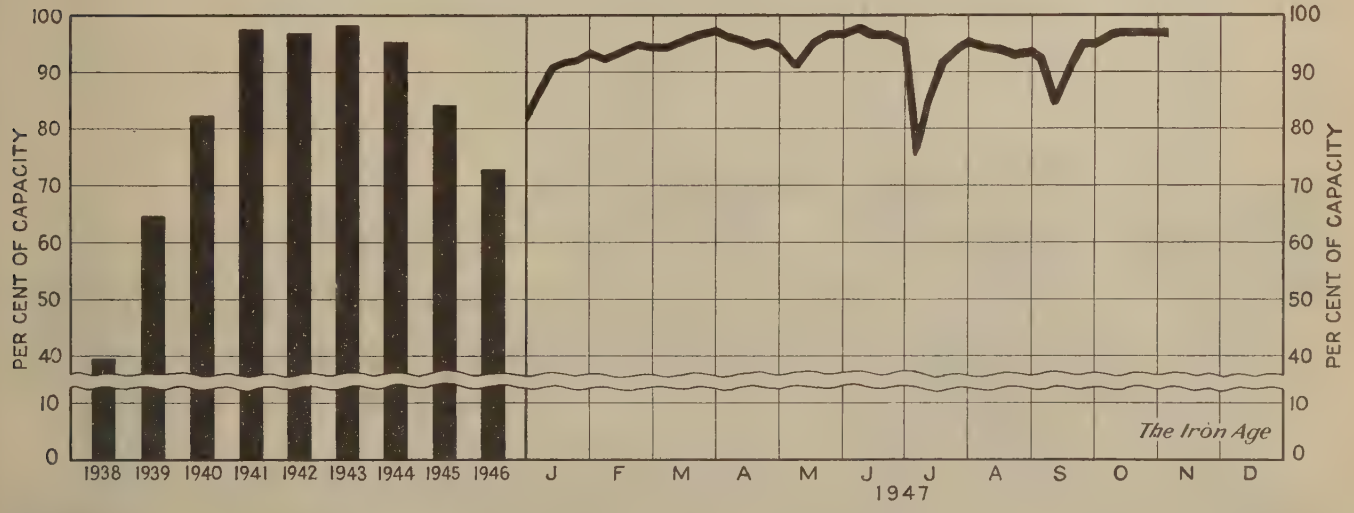
• **HIGHER PLATE PRICE**—Central Iron & Steel Co. has announced a $6 per ton increase in its price for carbon steel plates bringing it up to $4.45 per 100 lb. A Harrisburg basing point has not been established for plates. This price increase to $30 per ton above the price at major basing points is required by increasing costs of scrap and other raw materials, according to Basil M. Graham, president.

• **SEEK PIPE LINE EXPORT**—Administration officials sought this week to justify before the Senate Small Business Committee additional pipe export license applications from backers of the Saudi-Arabian pipe line project, (THE IRON AGE, Oct. 16, p. 183.) Senator Wherry, R., Neb., committee chief, told C. Tyler Wood, deputy assistant secretary of state for economic affairs, that "the amount of critical steel going into the project is of tremendous importance in the light of our domestic economy." Trans-Arabian seeks a fourth quarter export license for supporting commodities valued at $4,463,431, including $803,910 worth of nonpipe line steel. "I am confounded with the magnitude of the requirements," Senator Wherry stated. Representatives of the Office of Defense Transportation oppose the Saudi-Arabian project on the ground that it would divert steel badly needed for freight car construction.

• **NEW WRINKLE IN PIPE LINES**—Representatives of all the larger oil companies are pressuring steel sources for more plate. A few of these consumers have lately propositioned the mills on supplying 14 gage coils allegedly intended for making welded spiral pipe. Ordinarily this type of pipe has always been made in small quantities to work at very low pressures and has never been used to date for main line transmission of oil or gas.

• **SCRAP MARKET TESTING**—The scrap market is in for another testing. The last time consumers tried to drive the market down it failed to react that way. Quotations went down a few dollars but when old orders at higher levels ran out quoted prices rose. Apparently the reason why a few thousand tons went at lower prices several weeks ago was due to the averaging out by brokers who took it on the chin in order to be "nice" about the lower priced orders. This week the whole cycle looks as if it would repeat itself. After buying scrap at $43 a ton a Pittsburgh mill now says it is "out of the market." Whether this will have the effect of lowering the price of scrap remains to be seen. The thinness of the spot scrap market is giving old timers daily nightmares. Changes when they do come are substantial. Earmarked scrap prices are determined by spot prices and since little scrap is free these days gyrations in quotations will be the rule until a deflationary trend sets in.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
October 21	106.0	95.5	92.0*	92.0	94.5*	102.0	101.0	98.0	101.0*	104.5	96.0	74.0	94.0	97.0
October 28	106.0	95.0	90.0	92.0	96.5	102.0	102.0	98.0	101.0	107.0	104.0	80.0	94.0	97.0

* Revised.

18 Molds . . . Machined

● Total turning time is seven hours—on a set of 18 inserts (six of each) for a multiple-cavity gasket mold.

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The Monarch-Keller was the *original* tracer-controlled lathe; over 1,000 are now in use. These Keller controls, adaptable to any Monarch Lathe above the 12″ size, permit fast, accurate, *economical* turning, facing and boring of irregular contours from a thin metal master template. When not in use, the controls can be quickly disconnected to permit regular turning work. For complete details, ask for our new bulletin 2401, on the improved Monarch-Keller Form Turning Machines.

ACCURACY · ECONOMY · LONG LIFE

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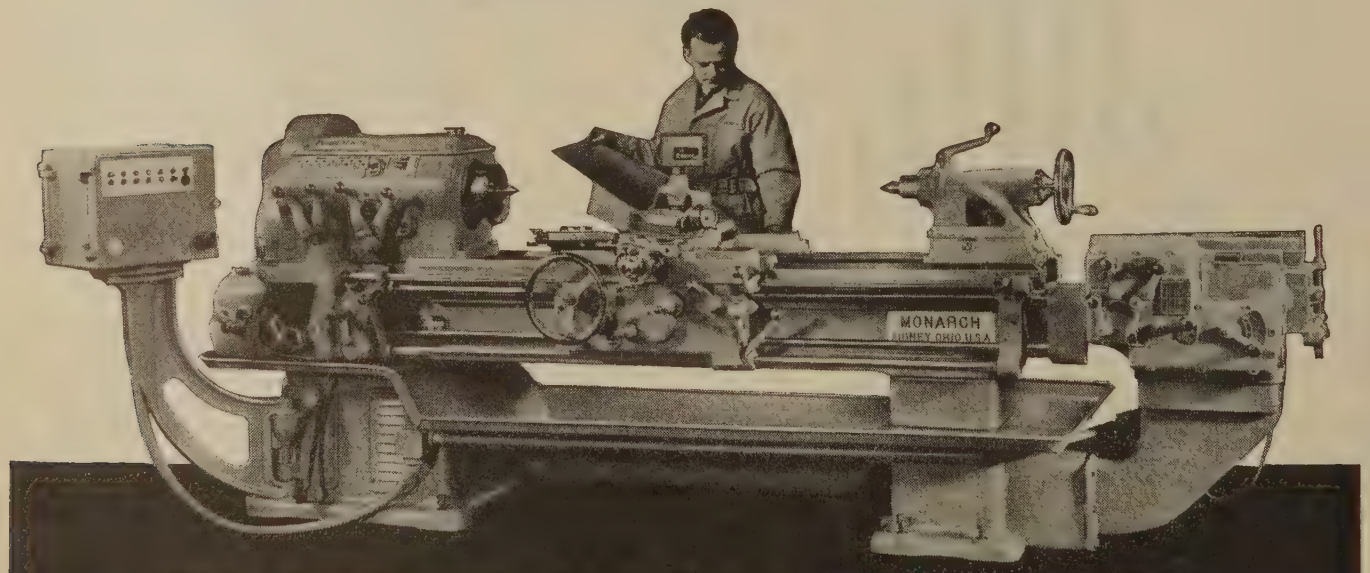


FOR A GOOD TURN *FASTER* — TURN TO MONARCH

Rail Freight Rate Increases Called Blow to Pittsburgh Mills

Boosts on Percentage Basis Add to Absorption; Hurt Established Markets

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

Pittsburgh

• • • **The latest rail freight** rate increase is another blow to Pittsburgh's position as a steel producer. Each time national freight rates are increased on a percentage basis it means mills here must absorb more freight to compete in certain essential markets. Percentage rate raises oblige Pittsburgh producers to absorb progressively — in dollars and cents — than their competitors when they sell on the Eastern Seaboard and in some sections of the Middle West.

And if the present interim increase is replaced by the larger boost the carriers seek, Pittsburgh mills will fare even worse in the competitive picture. Steel sales executives privately admit this is a dim prospect for their customers. There is a limit to how much freight a mill can absorb and still earn a reasonable profit. Recent increases, coupled with a sellers' market, have led a number of steel companies to drop out of certain markets where they considered freight absorption too high.

If rates go up further, well informed observers believe additional points and products will be affected. Even in the buyers' market which most steel executives are already planning on, this freight absorption is bound to be a factor, these sources say. For when operations fall off and the break-even point begins to show under today's shiny surface, freight costs will loom large in the profit picture.

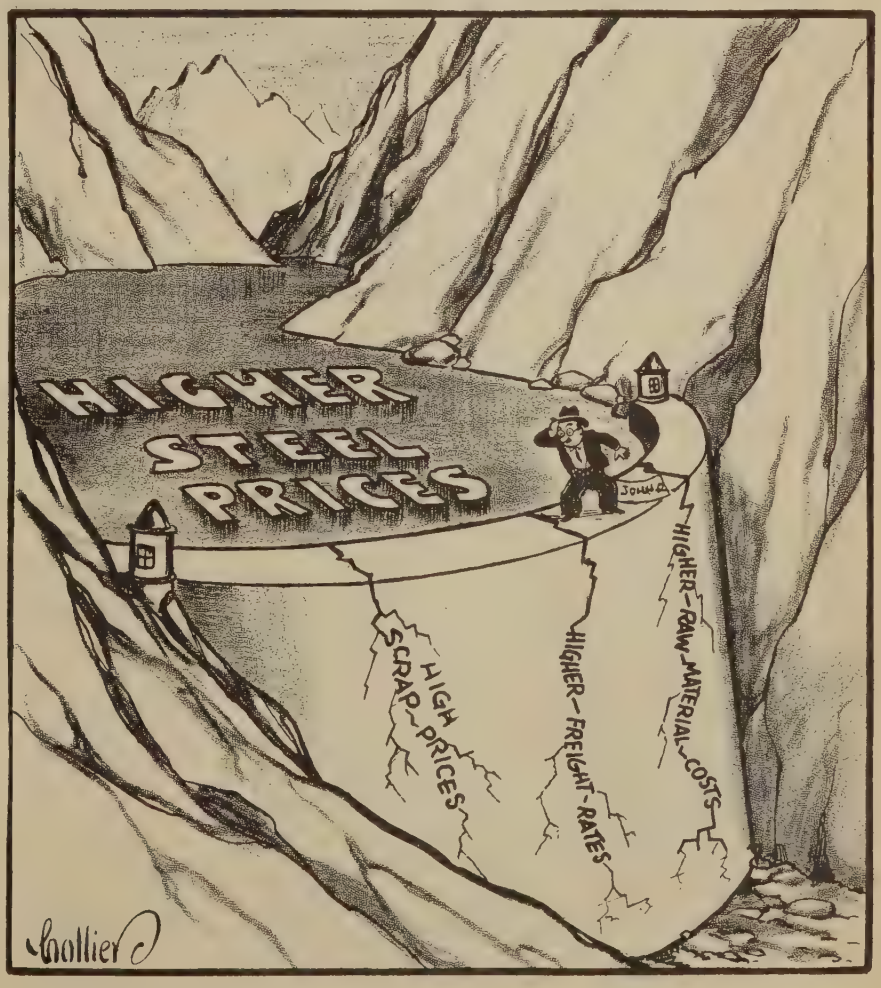
This is not entirely a local matter. Other mills serving other markets are reportedly running into a similar problem. Nationally speaking, however, Pittsburgh's is probably the most serious position, since about a fourth of the country's steel is produced here.

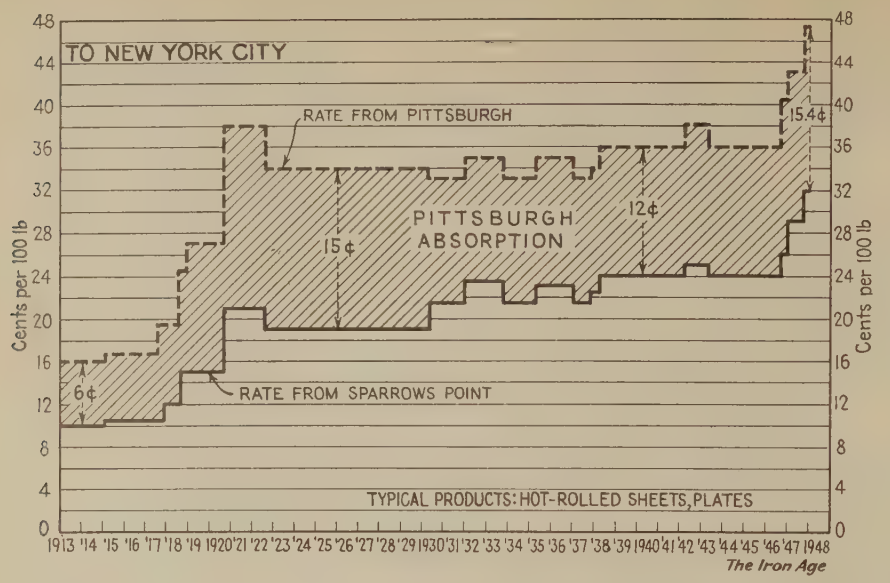
Before 1900 a far larger proportion of the steel market was in the Pittsburgh area than it is today. Here the industry spent its youth, as it were. And around it clustered many of the steel consumers — relative freight costs were no problem. The building of the Gary Steel Works around the turn of the century was an indication of the beginning of the decentralization of the industry. This trend received added impetus just before World War I. Detroit, for instance, did not become an important consumer until the country began to make more cars than cast iron stoves — after World War I.

The cost of moving a ton of steel from Pittsburgh to New York increased from $2.90 a ton in 1905 to $9.46 a ton today. Meanwhile, the Baltimore rate went from $2 to $6.38. The differential increased from 90¢ to $3.08 a ton—a 242 pct jump. The freight rate increases that have hit Pittsburgh the hardest began in 1917. With only a few minor exceptions, these increases have been on a percentage basis. This is what hurts Pittsburgh mills.

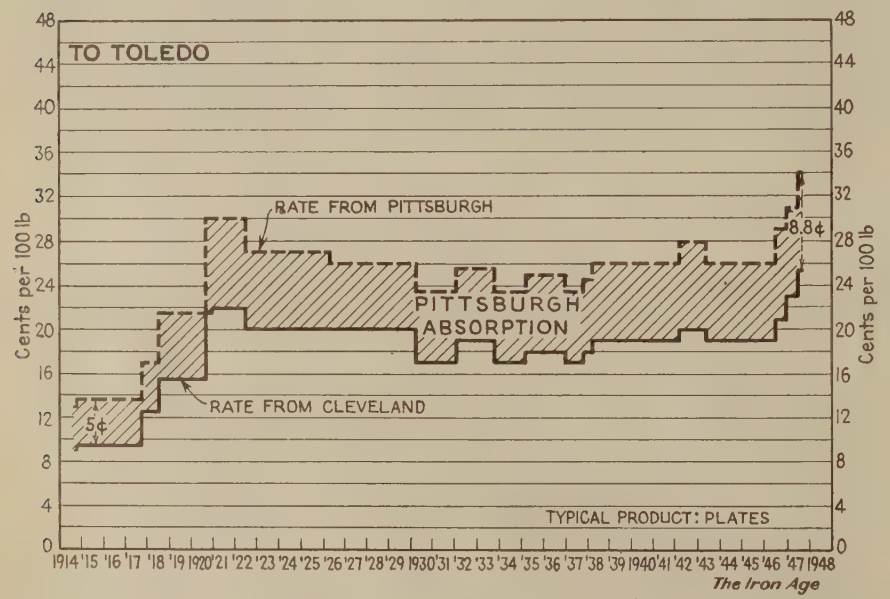
If increases were made in flat dollars and cents per ton, local mill sources explain, they would not be pushed into a more and more unfavorable competitive position each time a new rate rise is granted. They assert that flat rate increases are preferable to percentage boosts because they do

Quick Repair Needed

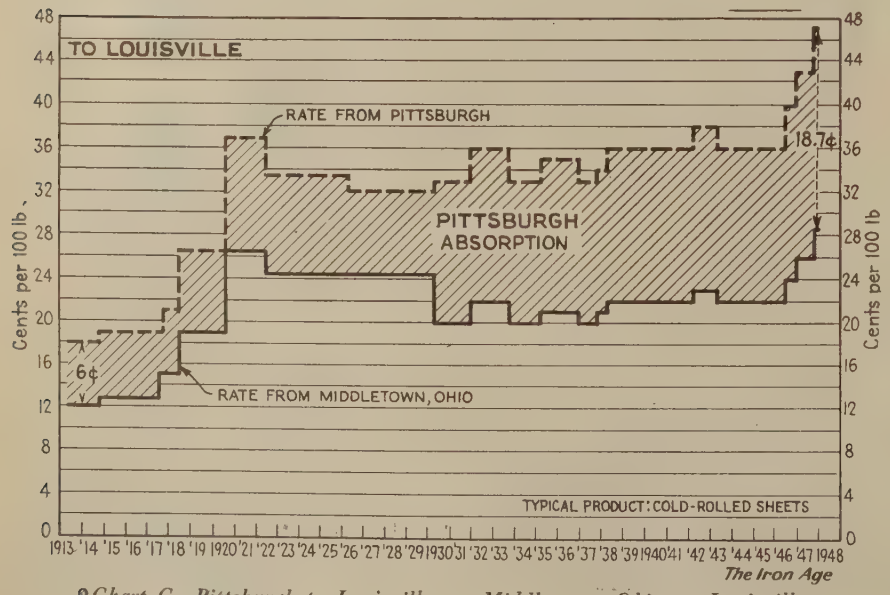




•*Chart A—Pittsburgh to New York City vs. Sparrows Point to New York City*



•*Chart B—Pittsburgh to Toledo vs. Cleveland to Toledo*



•*Chart C—Pittsburgh to Louisville vs. Middletown, Ohio, to Louisville*

not disrupt normal market relationships.

Iron and steel rail freight rates, beginning with a 15 pct advance in 1917 and followed by a 25 pct advance in 1918, were given a major boost, 40 pct, in 1920. In 1938 there was a further 10 pct increase. On top of this came a 20 pct boost in January 1947 and a 10 pct interim increase effective Oct. 13, 1947. These are not all, but are considered the major contributions to Pittsburgh's maladjustment. This latest jump is temporary; it was granted pending Interstate Commerce Commission action on the carriers' request for a 38 pct average boost.

The accompanying charts compare freight rates from Pittsburgh to New York, Louisville and Toledo. These points were selected to illustrate the competitive conditions faced by Pittsburgh mills. Other points and other products could be selected. It should be understood of course that rail rates generally are the same for all items classified as "finished iron and steel products."

While the competitive situation is generally believed to be more serious on sales to the eastern seaboard, the two midwestern locations were also selected to show that the condition was not peculiar to the eastern seaboard and the heavy industrial areas in Connecticut, New York, New Jersey and around Philadelphia. Incidentally, in the Toledo market, Youngstown mills also have an absorption cost—though a lesser one—as against the Middletown, Ohio, basing point.

Wins Welding Award

Pittsburgh

• • • **For the second** year in succession, Julius Heuschkel, welding specialist at the Westinghouse Research Laboratories, has won the $750 first prize in the annual contest of the Resistance Welder Manufacturers' Assn., it was announced recently by the American Welding Society.

The 1947 award, made through the society, honors Mr. Heuschkel for his paper on metallurgical aspects of carbon steel spot welding. In 1946 his paper outlining spot welding schedules for low carbon steels took top honors.

Europe's End Product Needs Seen More Important Than Raw Steel

Washington

• • • **Administration** officials who are now studying the Marshall Plan and its requirements have been privately advised that if both metal and dollar credits were available in the United States, Europe would require for a considerable period several times the amount of steel now being exported, THE IRON AGE has learned. This potential purchasing would be at the rate of nearly 10 million tons annually, it is said.

In direct contrast with the recent Krug report, this information is to the effect that Europe's immediate needs are not nearly as urgent for ingots and other unfinished steel as for such end products as machinery, equipment and repair parts.

The Krug report stated that "the most urgent foreign demand is for various kinds of ingots and rough shapes for which adequate finishing capacity is available in the United States."

The material now being studied is said to show that in the normal prosperous year European consumption of steel—exclusive of the USSR—would amount to about 40 million tons. To this is added new requirements generated by the war, by destruction of plants as well as limited production in wartime for civilian uses, and newly created uses.

At the same time, it is estimated that current European capacity is running at less than a 35-million ton annual rate. Officials have been told that the rate in Western Germany is less than 3.5 million tons, about 16 million tons below prewar capacity, while the French production is about 5 million tons or about 4 million below rated capacity.

Of the German capacity, it is estimated that 10 to 12 million tons suffered serious war damage and will require extensive repairs before it can be put into production. In addition, several millions of additional capacity lies unused in France, Austria and Italy, largely because of the lack of coal.

Studies Show Europeans Will Consume 40 Million Tons Of Steel Per Year

It is more than a problem of utilizing present unused capacity, officials have been told. In some cases, such as in France, for example, facilities must be modernized; in others, facilities must be expanded.

Overall French capacity is rated at around 9 million tons. Doubt is expressed by some officials as to whether French production can be raised above—or even to—7 million tons because of the obsolete nature of some of the plant equipment.

Under the proposed Monnet plan, it is provided that the eventual French steel capacity should be raised to about 12 million tons. This would require, in addition to restoring present rated capacity, expansion of existing facilities by 3 million tons.

Officials have been warned that recovery of the steel industry cannot proceed alone or at a faster rate than the production of machinery and equipment—that both go hand in hand.

Unfortunately, it has been emphasized, machinery and equipment shortages do not apply alone to special groups such as industrial, mining or agricultural categories. They apply equally to motors, generators, food-processing equipment, cigarette-making machines and on down the line indefinitely.

In the light of the information under study, the problem is—in view of limited steel, nonferrous metals and other raw materials—to concentrate on increased production of the types of machines which in turn will contribute directly to increased production of critically needed finished products.

Viewed as even more important than machinery production, however, is the serious shortage of repair parts and the machines which produce them. A survey has indicated that of a great

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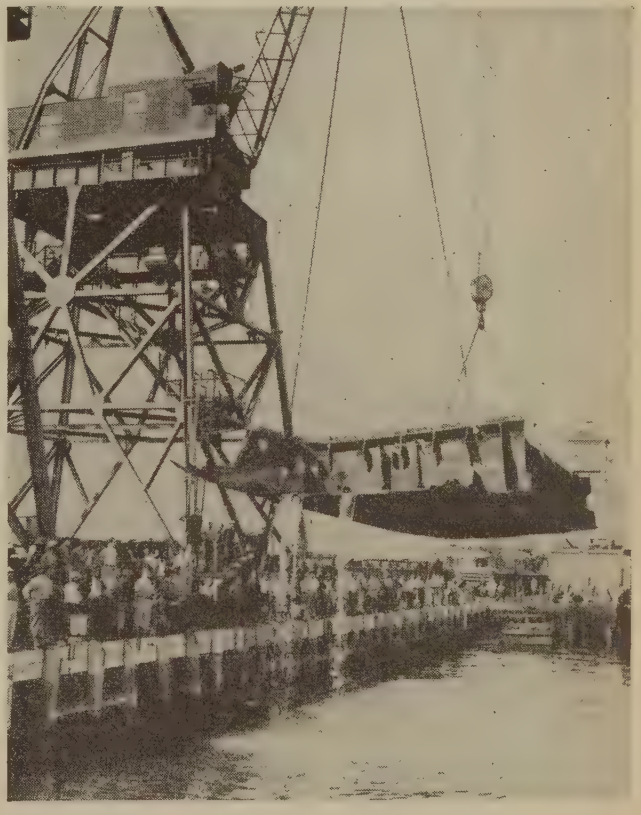
END OF THE NORMANDIE: *This 75 ton piece of steel, being lifted from the water at Port Newark, N. J., by a dockside crane, is the last of the once proud French liner Normandie. After burning at a New York pier in 1942, the Normandie was salvaged, refloated and towed to Port Newark for salvage.*

o o o



amount of machinery and equipment—in whole condition but unusable—as much as 85 pct could be put into operation if spare parts were available.

Here is a problem, however, which cannot be solved by American industrial production. Except for some standard items such as ball bearings, most continental machinery is of different types than American equipment, both as to size and specifications. It has been pointed out that even were specifications to hand, several months would be required for tooling up before American production could be started.

Problems of European exports also enter into the picture. In order to obtain dollar credits for purchase of machinery and parts, or materials for parts-making, other goods must be exported. Since these are usually of the luxury-type, use of labor and raw materials for this purpose means that much less for production of reconstruction goods by European factories.

Also restricting recovery and reconstruction are shortages of bullding materials. Most important among these are the raw materials—coal, steel and nonferrous metals. Europe is faced with a particularly urgent demand for fire bricks, it was found. However, while it is estimated that there is sufficient productive capacity in the United States and the United Kingdom to meet the requirements, there is a question of raw materials. France is believed to have sufficient quartzite for the purpose but here rises the problem of transportation.

Before transportation can be improved, steel must be obtained for locomotives, rails and ships, not to mention steel drums of which there is a critical shortage. However, it is indicated that once transportation has been ironed out, sufficient ore and scrap are obtainable to increase the steel production in Europe.

It is emphasized that recovery of the European steel industry must be a gradual process—that putting even the now idle capacity into operation would require additional coal and transportation. First, it is held that crucial needs for imported steel products must be met and then gradually the needs for imported steel ingots, as well as coal, will disappear.

Steel Industry Pays Dividends of $66.7 Million for Quarter

Washington

• • • **Publicly reported** dividends paid out by the iron and steel industry during September amounted to $39.1 million, bringing total reported cash payments to $66.7 million for the third quarter, the Dept. of Commerce reports. Public reports are estimated to account for about 60 pct of dividends paid.

Dividends for all industry for September amounted to about $559 million, an increase of about 20 pct over the same month last year, bringing the quarter's total to $1183 million as compared with $1015 million last year.

Mining dividends were up 147 pct over the third quarter last year, Commerce said, mainly by reason of a large oil payment as well as a change in payment date for a large copper company. For manufacturing as a whole, third quarter payments were up by a fifth over last year.

Total industrial dividend payments for the first three quarters, as reported by the department, are as follows (in millions and 1946 figures in parenthesis): First quarter, $1117 ($920); second quarter, $1157 ($999); and third quarter, $1183 ($1015); totals, $3457 ($2934).

Iron and steel dividend totals were: First quarter, $56.3 ($47.8); second quarter, $63.5 ($52.4); third quarter, $66.7 ($54.3); totals, $186.5 ($154.5).

Good Use!

Washington

• • • **A section of an unused blast furnace at Daingerfield, Tex., is currently being put to good, if a bit unique, use by Navy Ordnance. A wind tunnel has been developed for testing scale models of guided missiles and studying problems of supersonic flight.**

With the development of the wind tunnel for both fuel and combustion experiments, the Navy has eliminated the necessity for destroying an expensive and new engine for each test.

It can handle both fuel and combustion experiments, and the burner laboratory contains one outdoor and two indoor burner outlets. The wind tunnel test section measures 19 x 27.5 in., giving 3.6 sq ft of experimental cross section. Heat of 600° F and wind velocity up to 1800 mph can be provided for the tests.

The work was done by the Pittsburgh - Des Moines Steel Co.

Business Earnings For First Half '47 Excel Those of '46

Washington

• • • **On the basis** of earnings reported publicly, business earnings for the first half 1947 are running higher than last year, both before and after taxes, Commerce Dept. said in making public its compilations for the period.

Industry profits before taxes were estimated by the department to amount to $56.5 billion as against $34 billion after taxes. Second quarter profits showed a decline over first quarter returns.

Profits in the metal manufacturing industries were set at $2821 million before taxes and $1641 million after.

At the same time, the department estimated the gross national product for 1947 at $226 and estimated national income (wages, corporate profits, etc.) at $199 billion. Despite the decline of the profit rates in the second quarter when compared with the first quarter, the rate of national income continued to rise, trends showed.

Barium Shows Profit

New York

• • • **Barium Steel Corp.** reports consolidated net earnings for the 9 months ended Sept. 30 of $1,190,403 after all charges and after providing $683,655 for estimated federal income taxes, equal to 60¢ a share on the outstanding stock. This compares with a loss of $129,815 for the first 9 months of 1946.

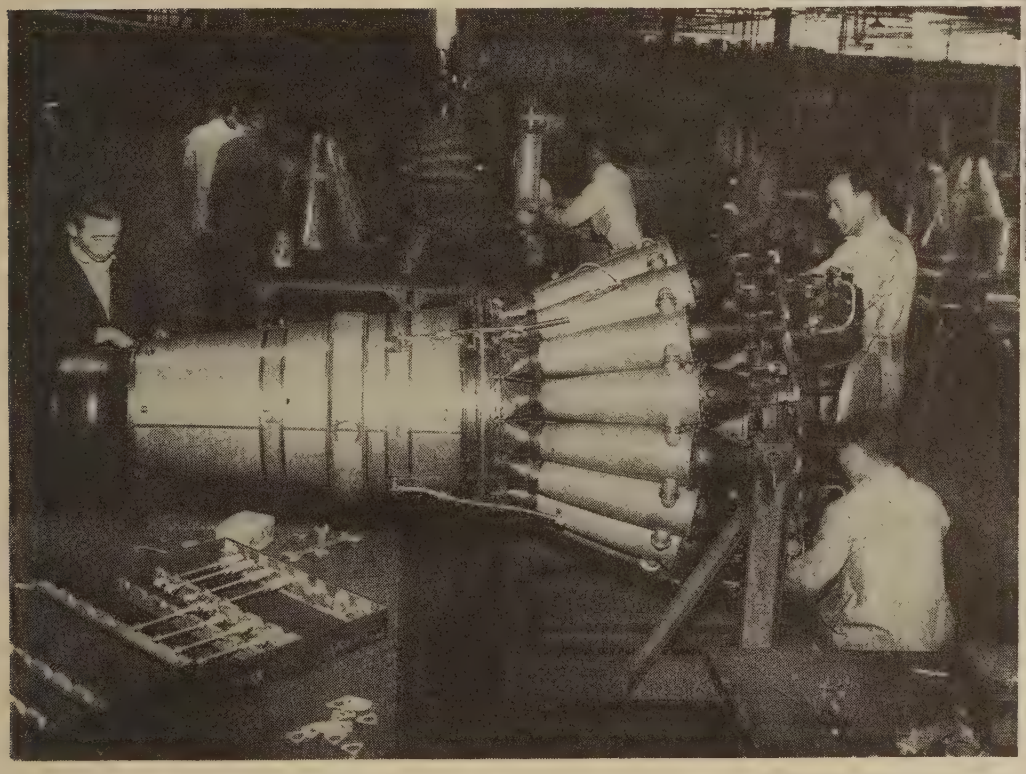
For the third quarter ended Sept. 30 consolidated net earnings amounted to $401,280 after all charges and after providing for estimated federal income taxes.

Sales for the first 9 months of the year amounted to $29,074,000 and unfilled business approximated $19,000,000 as of Sept. 30, 1947.

British Strive to Maintain Lead in Turbojet Engines

RIGHT

HAND-GRINDING IMPELLER: *This scene shows the hand-grinding and buffing operation being carried out on an impeller at the works of the De Havilland Engine Co. at Stonegrove, Edgware, Middlesex. Note that the impeller is of the single-sided type, which allows a minimum diversion of air while taking advantage of the ram effect in flight. The latest of the De Havilland gas turbines, named "Ghost", which will be produced for civil use, develops a thrust of* 5,000 *lb.*



LEFT

FINAL ASSEMBLY: *This is the Goblin Mark II—static thrust* 3,000 *lb. The* 16 *straight-through combustion chambers converge in the nozzle junction assembly in front of the turbine disc, whose sole duty is to extract enough power from the gases to drive the single-sided compressor. Residual energy passes out the exhaust cone providing the forward thrust.*

RIGHT

THE COMPETITION: *This scene is in the Rolls Royce jet engine plant. The industrious machinist is finish-turning a pair of rotating guide vanes for a "Nene" jet engine. At this stage precision tooling is an all important factor, as an old firm attempts to keep Britain on top in a new field. American jet engine production scenes were featured in* The Iron Age, *Sept.* 25, 1947.

Plans for Total Economic Mobilization Agreed Necessary

Washington

• • • **Rapid and total** mobilization of the nation's economy will be an absolute prerequisite to the successful waging of a future war.

This conclusion, developed last week in testimony before the Senate War Investigating Committee, has unanimous support in bureaucracy as well as industry. But opinion varies as to how the United States should plot its mobilization course.

First step toward enactment of a new mobilization law will be taken in January, when the committee, headed by Senator Brewster, R., Me., submits its recommendations to the Senate. The report will recommend immediate enactment of mobilization plans broad enough to provide a complete blueprint for a future emergency.

In the opinion of Defense Secretary Forrestal, the National Security Act of 1947 "gives us the best machinery that the country has ever had for securing our defense." The machinery needed to apply the mobilization lessons of World War II are provided in the act, he stated.

But Louis Johnson, Assistant Secretary of War from 1937 to 1939, declared that current Munitions Board mobilization plans "ought to be implemented with legislative authority now," and

Stockpiling Plea Entered By Louis Johnson; 17 Point Baruch Plan Offered

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that the only way for the U. S. to maintain the peace "is for America to be so damned strong nobody will attack us."

"Don't oppose the Munitions Board's request of $2.5 billion for stockpiling," he pleaded with the committee. "Public opinion will favor such a program today." Criticizing Brehon Somervell—former major general commanding the Army's Services of Supply—for scuttling the combined Army-Navy-industry mobilization plan of 1939, Mr. Johnson stated: "I would to God this program had gone into effect when war was declared. We need legislation now, so we don't have a General Somervell next time."

Bernard M. Baruch told the committee that if the nation is to look forward to continued peace it must enact legislation authorizing a war mobilization program to be checked every 6 months, both as to adequacy and personnel charged with administration.

The plan, he said, must provide for immediate mobilization of industry, manpower, and resources. This would involve complete control by the President over production through strict allocation and priority power, over manpower through work-or-fight authority, over the economy by rigid control of wages and prices.

Mr. Baruch said foot-dragging and fumbling and the failure to use the prewar mobilization plan as well as failure to apply full controls over production, manpower and prices cost the nation unnecessary lives and money. He commented wryly that "we were told that this was a different kind of war and that none of the old World War stuff was wanted."

Specifically, the Congress should at once enact a minimum 17-point program and provide that it at all times be kept ready to throw into gear on short notice, he declared. His recommendations:

(1) Mobilize the full military, economic and spiritual strength of America.
(2) Provide for universal military training and sufficient, modernized armed forces.
(3) Pool all manpower and impose a work-or-fight clause on all men and women subject to mobilization.
(4) Make a true inventory of our natural resources and prepare an industrial plan to include full control of production, distribution, prices, allocation and priority.
(5) Take unfair profits out of war and prevent inflation through an over-all price regulation, tax and savings program.
(6) Restrict materials and manpower for the civilian structure.
(7) Set up an organization to export and import critically-needed materials.
(8) Stockpile critically-needed imports.
(9) Retain war plants, particularly synthetic rubber plants.
(10) Intensify scientific research.
(11) Set up a standard form of contract.
(12) Enlarge an intelligence service far beyond what now exists.
(13) Organize information to be ready when action demands.
(14) Make surveys of potential underground industrial establishments and refuges for civilians.
(15) Check all these organizations every 3 or 6 months.
(16) Tighten up and make more specific the Munitions Board and the National Security Resources Board.
(17) Take the American people into the fullest confidence through congressional committees, "for the people will do anything required of them if they are told why."

Thomas J. Hargrave, chairman of the Munitions Board, told the committee the board's recently-completed "Industrial Mobilization Plan for 1947" will be submitted to a number of individuals and groups with requests for criticism and recommendations. The plan will be revised in the light of comment and eventually will be publicized, he added. Present plans call for division of the board's activities into four operating divisions—procurement, materials, products and services.

Coming Events

Nov. 2-5 **National Tool and Die Manufacturers Assn.**, annual meeting, Philadelphia.
Nov. 6-7 **National Founders Assn.**, annual meeting, New York.
Nov. 6-7 **Society of Automotive Engineers**, fuels and lubricants meeting, Tulsa, Okla.
Nov. 7 **Openhearth Committee, AIME**, annual meeting, Pittsburgh.
Nov. 7-8 **Annual Conference on X-Ray and Electron Diffraction, Mellon Institute of Industrial Research**, Pittsburgh.
Nov. 10-13 **American Institute of Steel Construction, Inc.**, annual meeting, Miami Beach, Fla.
Dec. 1-3 **Society of Automotive Engineers**, air transport meeting, Kansas City.
Dec. 1-5 **American Society of Mechanical Engineers**, annual meeting, Atlantic City, N. J.
Dec. 1-6 **Twenty-First Exposition of Chemical Industries**, New York.
Dec. 4-6 **Electric Furnace Steel Committee, AIME**, annual conference, Pittsburgh.
Jan. 12-16 **Society of Automotive Engineers**, annual meeting, Detroit.
Jan. 12-16 **National Materials Handling Exposition**, Cleveland.
Jan. 19-20 **Institute of Scrap Iron & Steel, Inc.**, annual convention, Chicago.

Weekly Gallup Polls . . .

U. S. Should Remain in UN Despite Soviet Obstinacy

Princeton, N. J.

• • • **Despite noisy and** mounting tension between the United States and Soviet Russia, the American public is not giving way to hysteria. It is evidencing very little desire to have the United States pull out of the United Nations because of Russia's continued bucking of the majority will, according to George Gallup, director, American Institute of Public Opinion.

Seven out of ten Americans want this country's efforts to make UN an effective international agency continued. In every segment of the population and in all sections of the country the weight of opinion is strongly in support of this view.

Thousands of Americans were asked this question in face-to-face interviews:

"Some people say that the United States should pull out of the UN organization if Russia continues to block the will of the majority of member nations. Other people say that the United States should stay in the UN even though Russia continues to block the majority. Which of these ideas do you agree with?"

The national results are:

	Pct
Stay in	73
Pull out	13
No opinion	14

While all groups in the population lean very heavily toward the view that we should remain a UN member, those persons with the most education give that view much the stronger support, as the following table shows:

	Stay in Pct	Pull Out Pct	No Opin. Pct
College	91	7	2
High School	81	10	9
Grammar	63	17	20

Similar, though not as pronounced, gradation of opinion turns up when the survey is analyzed by occupation groupings:

	Stay In Pct	Pull Out Pct	No Opin. Pct
Prof. or bus.	82	10	8
Write collar workers	76	13	11
Farmers	75	11	14
Manual workers	67	16	17

That this question has little chance of becoming a political issue in the near future is evidenced by the fact that the vote of Democrats and Republicans is identical with the national percentages.

In another question asked of the same representative voters a large majority declare that the United States should take an active part in world affairs. Isolationism is turned down by a 5 to 2 vote.

"Do you think it would be best for the future of this country if we take an active part in world affairs, or if we stay out of world affairs?"

National results:

	Pct
Active part	65
Stay out	26
No opinion	9

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• • • **In the political** struggle between the United States and Russia, the people of France think the United States is on top at the moment.

France, herself caught in the struggle between East and West, her own political make-up, part communist, part conservative, is in a unique position to observe and appraise the running diplomatic battle between Washington and Moscow. In French eyes, we're doing all right.

That's shown by a poll conducted throughout France by the French Institute of Public Opinion, affiliate of the American Institute.

The French poll asked voters:

"In your opinion, does the United States or Russia have the advantage in the struggle for influence on an international scale?"

French Poll Shows U.S. Is On Top in Struggle With Russia For International Influence

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	Pct
U. S.	50
Russia	14
No opinion	36

As for the future of France itself, most Frenchmen are pretty gloomy. They think things are going to get a lot worse for France before they get any better.

Only one Frenchman in 25 thinks things are progressing well in France today, whereas 93 pct say conditions are bad.

The polltakers asked:

"Do you think things are going well or badly in France today?"

	Pct
Well	*
Rather well	4
Rather badly	50
Badly	43
No opinion	3

(*Less than 1 pct)

"In a general way, do you think France is moving toward a more serious and troubled political scene or toward a more peaceful one?"

	Pct
More serious	77
More peaceful	7
No opinion	16

These poll results raise the question of whether France will turn increasingly Communist if conditions continue to be as bad as the people seem to expect they will be.

Although communism is supposed to feed and grow on bad social and economic conditions, the French public as a whole doesn't seem to think that the Communist Party of France has grown stronger in recent months.

"Do you think that the position of the Communist Party has grown stronger or weaker in the past 2 months?"

	Pct
Weaker	34
Stronger	21
No change	24
No opinion	21

Industrial Briefs . . .

• MORE MOTORCYCLES — Harley-Davidson Motor Co., Milwaukee, has made a substantial down payment for the purchase of the former A. O. Smith Propeller Corp. plant at Butler, Wis., which was bought from the WAA last year by Borg-Warner Corp.

• PLANS SCRAP PLANT—Lieberman Koren Corp. has purchased an industrial block at Pitkin and Glenmore Aves., in Brooklyn, where they will handle and process heavy scrap items.

• E. G. GRACE HONORED—The Charles F. Rand Gold Medal had been awarded by unanimous vote of the Directors of the American Institute of Mining and Metallurgical Engineers to Eugene G. Grace, chairman of the board, Bethlehem Steel Corp., for "distinguished achievement in mining administration."

• ADDS TO PLANT—Micromatic Hone Corp., manufacturers of honing machine tools and equipment, has completed and occupied a new 38,000 sq ft addition to its main plant in Detroit.

• CHANGES ADDRESS — The Brush Beryllium Co. has moved its offices to 4301 Perkins Ave., N.E., Cleveland. The building will provide space for expansion of the company's research division.

• NEW FOUNDRY—A new $150,000 foundry has been put into operation at Sharon, Wis., by Sharon Industries, Inc., subsidiary of Sta-Rite Products, Inc., Delavan, Wis., manufacturers of electric water pumps and allied products.

• OPEN HOUSE—Carrier Corp. Syracuse, air conditioning and refrigeration equipment, celebrated their tenth anniversary by holding an open house at their new plant, recently acquired from the WAA, which adds 600,000 sq ft of manufacturing space to the company's facilities.

• STILL EXPANDING—Construction of a new factory to provide 785,000 sq ft of production area for the manufacture of diesel wheel type tractors and motor graders and for the final assembly of scrapers, wagons and rippers has been started by the Caterpillar Tractor Co., Peoria, Ill.

• MOVES OFFICE—Anchor Post Fence Div., Anchor Post Products, Inc., has moved its Boston location to Needham St., Newton Highlands, Mass.

• OPENS RESEARCH LABS — Southwest Research Institute, San Antonio, Tex., a nonprofit organization designed to aid Southwestern industry solve its technological problems, has opened its laboratories and has contracted for several projects sponsored by industrial corporations.

• ELECTS CHAIRMAN—Maurice C. Taylor, director of research and development of the Mathieson Alkali Works, Inc., Niagara Falls, N. Y., has been elected chairman of the western New York section of the American Chemical Society.

• FORMS COMPANY — Louis Lyon, Jr., has formed his own organization, Lyon & Co., Park Bldg., Pittsburgh, to represent several manufacturers of refractory products. Mr. Lyon was formerly Pittsburgh district sales manager of National Refractories Co. of Philadelphia.

• AWARDED GOLD MEDAL—Matthew Luckiesh, General Electric Co. lighting research laboratory director of Cleveland, has been awarded the Illuminating Engineering Society Gold Medal.

• BOSTON OFFICE — Browsky Trading Corp., iron and steel scrap dealer, has opened a Boston office at 7 Water St. The concern maintains handling facilities at Mystic Wharf, Charlestown Station, Boston.

First Quarter 1948 Tinplate Quotas Out

Washington

• • • **First quarter 1948** country allocations of export tinplate have been made public by the Office of International Trade. The total allocation amounts to 120,000 tons on which CXS ratings will be granted, unchanged from the fourth quarter 1947 quota.

The 120,000 tons will be apportioned in the following manner:

Latin American Countries

Country	Quota
Argentina	8,500
Bolivia	200
Brazil	11,000
Chile	3,500
Colombia	700
Costa Rico	23
Cuba	4,300
Dom. Republic	115
Ecuador	70
Guatemala	50
Haiti	23
Honduras	20
Mexico	4,500
Nicaragua	30
Panama	50
Paraguay	150
Peru	900
El Salvador	23
Uruguay	1,400
Venezuela	800

Non-Latin American Countries

Australia	12,000
New Zealand	3,200
South Africa	6,500
Southern Rhodesia	285
Middle East	1,450
Turkey	1,000
Philippines	1,200
French North Africa	3,200
France	3,000
China	1,500
Belgium	5,500
Denmark	1,800
Norway	6,000
Netherlands	9,500
Italy	5,000
Trieste	70
Portugal	3,200
Spain	350
Sweden	3,500
Switzerland	3,200
Madagascar	650
Eire	450
Greece	1,000
Newfoundland	50
India	2,500
Malaya (St. Settlements)	600
New Caledonia	50
French Equatorial Africa	25
Indo-China (French)	400
French West Africa	200
Netherlands East Indies	1,500
Hong Kong	280
Portugese West Africa	130
Portguese East Africa	70
Belgian Congo	125
Jamaica	25
Siam	100
Contingency for other destinations	4,036
Total	120,000

In addition to the above amount with priority rating there has been allocated for export 10,000 short tons of unrated tinplate for the packing of food to be brought back to the United States.

There is also available for export an allocation of 12,000 short tons of tinplate which will be considered for approval on the basis of certain other essential end uses.

Foreign Trade Down During August, Due To Drop In Imports

Washington

• • • **American foreign trade** declined in August with virtually all the decrease accounted for on the import side of the ledger, according to latest Commerce Dept. reports.

While August overall exports remained static at $1139 million, the department revealed, foreign shipments of iron, steel, coal and some other goods, largely foodstuffs, increased. Decreased shipments were made in finished steel manufactures, largely industrial and electrical machinery.

Major exports for August included 9.9 million tons of coal, $36 million worth (tonnage not available) of iron and steel semimanufactures such as ingots, plates, sheets, 24,423 motor trucks, 23,126 passenger cars, 166 airplanes and 323 airplane engines.

Exports of 4.1 million bbl of crude oil, 3.4 million bbl of motor fuel, and 1.1 million bbl of lubricating oil were more than balanced by imports of 7.9 million bbl of crude and 3.8 million bbl of gasoline and fuel oil.

Importations included 102 million lb of crude rubber, 36,500 tons of copper, 4586 tons of nickel and alloys, 4700 tons of tin and 8350 tons of tin ore.

Export value of iron and steel semimanufactures aggregated $36.3 million in August, including $13.8 million worth of ingots, $12.4 million worth of plates and sheets, and $7.1 million worth of tinplate and taggers tin, all of which represented increases over July.

Shipments overseas of industrial machinery declined from $116 million to $100 million and electrical machinery from $49.5 million to $43.4 million. Agricultural machinery shipments increased from $26.2 million to $28.5 million for the month.

General imports declined in value from $49 to $399 million, nearly all of which was reflected in trade with Asia, Australia and Oceania. Exports to these three areas decreased by $31 million for the month and imports dropped $41 million.

Rubber imports from British Malaya declined to 39,500 tons from the July figure of 55,500 tons. Curtailed exports, largely raw cotton and machinery, accounted for the $20 million drop in trade with that nation since there was little change in the import level.

Reports on Industrial Uses of Atomic Energy

Washington

• • • **A preliminary** report on possible industrial applications of atomic energy is being written by a business advisory committee to the Atomic Energy Commission and will be submitted to AEC by Dec. 15.

AEC officials described the work of the new committee as "a long range program of expanded industrial participation" in the atomic energy program. James W. Parker, of Detroit Edison Co., heads the advisory committee.

Committee members are scheduled to visit AEC's Oak Ridge plant on Oct. 30 and 31. Other installations and contract-operators will be visited later, and all necessary information will be made available to the advisers, the commission stated.

In addition to officials previously named, members of the committee include Bruce K. Brown, of Pan American Petroleum & Transport Corp.; William F. Gibbs, of Gibbs & Cox; Isaac Harter, of Babcock & Wilcox Co.; J. C. Hunsaker, of National Advisory Committee for Aeronautics, and Gabriel O. Wessenauer, of Tennessee Valley Authority.

Martins Ferry Plant Sold

Pittsburgh

• • • **Blaw-Knox Co.** has sold for an undisclosed amount the plant formerly operated by its Martins Ferry Div. at Martins Ferry, Ohio. The purchaser was Louis Berkman, of Steubenville, Ohio.

50 YEARS AGO

THE IRON AGE, *October 21, 1897*

• Comment on American machine tools in British London Engineer—"The use of the machine tool in America is entirely unrestricted. We have not the least hesitation in saying that many English firms can and will produce tools as good. A noticeable feature of the American tools is the shortness of the crank handles or their replacement by little wheels. To the English mind, this does not give the same sense of power and security. Moreover, the control is unquestionably less complete and the labor is rather increased, if anything."

• **"The Farmers' Handy Wagon Works, Saginaw, Mich., are building wagons with roller bearing hubs. Recently they exhibited a large number of these wagons in a street parade, showing the ease with which heavy loads could be drawn with hubs of this kind."**

• "Announcement is made that at Racine, Wis., a deal was consummated transferring the great plant of the I. J. Case Threshing Machine Co. to a syndicate of Eastern capitalists."

• **"George Mortimer Pullman, president of the Pullman Palace Car Co., died suddenly of heart disease at Chicago on Oct. 19."**

• "The Mahoning Valley Iron Co. at Youngstown, have furnished a statement showing the average monthly wage of each man in September was $36.60. This compares with $22.67 per month average for a year ago."

• **"The order for 26,000 tons of steel rails from the Japanese government, just booked by the Illinois Steel Co., ought to convince the managers of that great concern that it is well worth while to cultivate foreign markets."**

Construction Steel . . .

• • • **The estimated total** bookings of fabricated structural steel for September, according to reports received by the American Institute of Steel Construction, amounted to 131,702 tons. While slightly less than the bookings for the previous month, bookings held up to the average established during the first 8 months of the year. The bookings for the first 9 months, amounting to 1,187,357 tons, showed an increase of 8 pct over the bookings in the same months in the 5 prewar years 1936 to 1940.

September shipments, reported at 150,952 tons, showed an increase of 10 pct over the same averaged month in the 5 prewar years, while the shipments for the 9 months were 24 pct greater than for the same months in the prewar period.

The tonnage available for fabrication as of Sept. 30 was 648,078 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry 1947	Estimated Total Tonnage for the Entire Industry Av. 1936-1940
Contracts Closed		
January	104,973	107,578
February	125,881	96,280
March	149,634	124,558
April	161,338	110,783
May	112,954	126,237
June	103,273	125,835
July	152,834*	152,481
August	144,768*	113,135
September	131,702	137,982
Totals	1,187,357	1,094,869
Shipments		
January	140,650	92,578
February	136,126	88,626
March	137,799	115,031
April	157,392	123,650
May	154,980	123,225
June	151,882	129,969
July	156,749*	127,422
August	144,927*	136,389
September	150,952	137,255
Totals	1,331,457	1,074,145
Tonnage available for fabrication within the next 4 months	648,078	362,278

*Revised.

• • • **Fabricated steel awards** this week included the following:

1265 Tons, Thermopolis, Wyo., superstructures for bridges, relocation of C.B.&Q. R.R., Bureau of Reclamation, Spec. 1901, to American Bridge Co., Denver.

660 Tons, Chicago, Bonwit Teller Building, to American Bridge Co.

365 Tons, Milwaukee, steel joists for Estabrook housing project through Schroedel Construction Co. of Milwaukee to Bethlehem Steel Co., Bethlehem.

355 Tons, Marquette County, Wis., State Highway Dept. project FAS 02-3, L. J. Arnold Co., low bidder.

270 Tons, Lewis County, Wash., Cora bridge and approaches, P.S.H. No. 5, through Anderson Bridge Construction Co. to Poole & McGonigle.

200 Tons, Alexandria, Va., service building for Virginia Electric & Power Co. to Virginia Bridge Co., Roanoke, Va., through Stone & Webster Engineering Co., Boston.

165 Tons, Rock County, Wis., State Highway Dept. project B-030-2-19. LaCross Dredging Co., low bidder.

150 Tons, Tomahawk, Wis., paper mill for Tomahawk Craft Co. to Northeast Boiler & Welding Co.

150 Tons, Blackstone, Mass., state bridge to Bethlehem Steel Co., Bethlehem, through M & R Construction Co., Boston, contractors.

145 Tons, Brown County, Wis., State Highway Dept. project FAS 020-3-11. John O'Keefe, low bidder.

140 Tons, Jefferson County, Wis., State Highway Dept. project FAS 04442-1. T. C. Vitcenda, low bidder.

100 Tons, Tremipealeau County, Wis., State Highway Dept. project S 0601-S. L. G. Arnold, Inc., low bidder.

100 Tons, Dunfres, Va., transmission line for Virginia Electric & Power Co. to Bethlehem Steel Co., Bethlehem, through Stone & Webster Engineering Co., Boston.

100 Tons, Stamford, Conn., power plant for Connecticut Power Co. to Berlin Construction Co., Berlin, Conn., through Stone & Webster Engineering Co., Boston.

• • • **Fabricated steel inquiries** this week included the following:

315 Tons, Park County, Wyo., State Highway bridge S-268-3. Bids closed Oct. 24.

• • • **Reinforcing bar awards** this week included the following:

425 Tons, State of Wisconsin, Marquette and Eau Clair Counties paving projects FAS 02-3 and S 0681-1 to L. G. Arnold Inc.

175 Tons, Rock County, Wis., paving project V 030-2-19 to La Cross Dredging Co.

150 Tons, State of Wisconsin, Manitawa County and Shawano County projects S. 0749-1 and S 0107-3 to Waterways Engineering Co.

145 Tons, Brown County, Wis., paving project FAS 020-3-11 to John O. Keefe.

145 Tons, Tomah, Wis., sewage treatment plant through Central Engineering Co. of Oshkosh to J. T. Ryerson and Son, Chicago.

140 Tons, Jefferson County, Wis., State Highway paving project FAS 0442-1 to T. C. Vitcenda.

100 Tons, Tremipealeau County, Wis., paving project S 0601-2 to L. G. Arnold Inc.

• • • **Plate awards** this week included the following:

100 Tons, East Providence, fuel tanks for Gulf Oil Corp. to Chicago Bridge & Iron Co., Chicago.

• • • **Railroad car awards** this week included the following:

The New York Central has ordered from the Greenville Steel Car Co. 1000 70-ton hoppers. This railroad will also build 2000 55-ton hoppers in their dispatch shops. Pullman Standard Car Mfg. Co. will build 800 50-ton gondolas for the Atlantic Coast Line R. R. The Western Maryland R. R. has ordered 1000 50-ton hopper cars from Bethlehem Steel Co., Bethlehem.

Construction Soars To Highest Dollar Volume In 27 Years

Washington

• • • **A 27-year high in dollar** volume of construction has been reached with expenditure for the first three quarters of 1947 of $10.5 billion for all types of building, including major repairs, the Bureau of Labor Statistics reports. This exceeds 1946 figures by 27 pct.

Contributing to the large total was the continued rise of both construction and employment during September, up 19 and 10 pct over September 1946.

Dollar volume rose $31 million, according to BLS, to bring September expenditures to $1.5 billion. During the month, some 35,000 workers were added to building pay rolls to raise the industry's employment to 1,925,000.

Accelerated activity in construction of service buildings such as stores, garages, etc., largely accounted for the September gain. However, for the 9-month period, private residential building was up 50 pct over last year, $3.3 billion as against $2.2 billion.

With $1.3 billion having been spent in private industrial construction, this type of activity for the first 9 months has a greater dollar volume than at any time since 1920, the BLS said.

Statistics on public construction showed little gain for September but with renewed programs for educational institutions, public highways, etc., building activity for the year showed an increase of more than 47 pct.

Publicly financed residential construction has continued to decline throughout the year, the total dropping 47 pct behind 1946 expenditures for the 9-month period. Privately financed residential construction for the same period jumped from $5.5 billion in 1946 to $6.9 billion for this year.

British Production Of Steel in Upturn During Past Month

London

• • • **Steel output in** Britain in September was at the annual rate of 13,841,000 tons compared with 12,178,000 a year in August and 12,402,000 tons in September 1946. This is the highest production rate ever recorded for the month of September and is the highest rate of production for any month since March, 1943. This production has been achieved in spite of the fuel situation and a shortage of scrap which has become more obvious in the last few weeks.

The industry is well on the way to achieving not only the target figure for 1947 but also placing itself in a good position to go ahead towards the target of 14 million tons fixed for 1948. Output in the early months of the year was depressed by the fuel crisis and in March shrank to just over 10 million tons a year. Later, holiday influences curtailed production, but signs of an acceleration were seen at the end of August, in the last week of which the rate exceeded 13½ million tons a year.

The government's target for 1947 is a total of 12,500,000 tons and the British Iron & Steel Federation stated 2 months ago that to achieve it, output would need to be increased to a rate of 13,500,000 tons for the rest of the year. This figure, it will be seen, was exceeded in September.

It is pointed out by the British Iron & Steel Federation that the continued maintenance of a high rate of steel production depends primarily on the implementation of the coke allocations and on the return to the steelworks of all possible scrap supplies. So far as fuel is concerned, it is apparent that the government is determined to do all it can to supply the necessary quantities to permit the steel industry to achieve its target figures.

It is the government's policy to concentrate on essential industries and on industries and trades which can prosecute the export drive, even if unemployment results from other industries being deprived of fuel and raw materials. It can be taken for granted, therefore, that whatever happens, the iron and steel industry will be supplied with the fuel it needs. If the present scrap shortage is not alleviated, and it is difficult to see how it can be alleviated quickly, even more fuel than was expected will be required, for more blast furnaces will have to be put into operation.

Coincident with the latest increase in the prices of iron and steel, the maximum prices scrap buyers were allowed to pay were increased by varying amounts, ranging from 30¢ to $1.12 per ton for old iron and steel to be used in the manufacture of steel ingots. This was more a gesture than anything else and was designed to counteract the increased cost of rail carriage due to higher railway charges rather than a contribution to scrap producers' costs.

Pig iron output also has increased. Production in September was at the rate of 7,805,000 tons a year compared with 7,660,000 tons in August and in September 1946.

Rules Governing Export Of Atom Equipment Soon

Washington

• • • **Regulations governing** export of equipment used in the production of atomic energy are now being written and will be put into effect within the next few weeks.

The new controls, which are required by the Atomic Energy Act of 1946, will supplement existing State and Commerce Dept. regulations, AEC said, and probably will be placed in effect by Nov. 10.

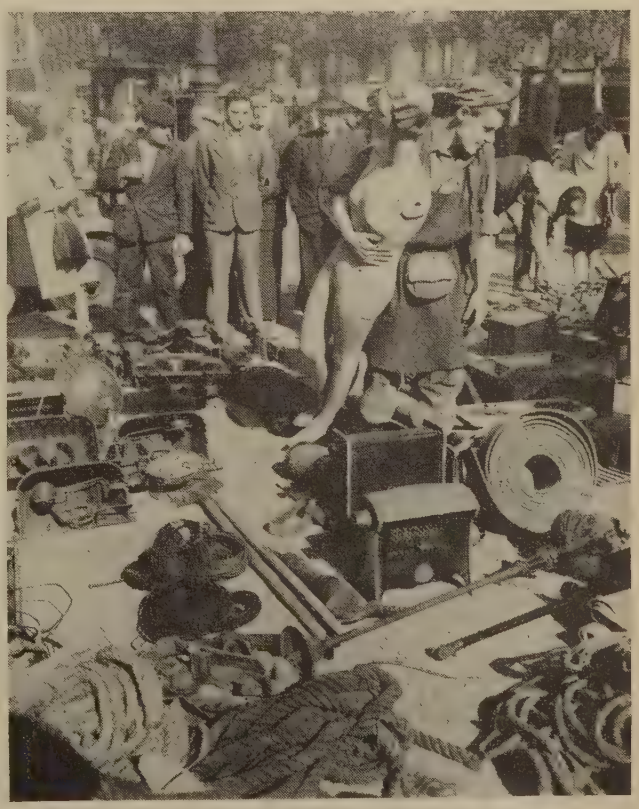
AEC has been discussing with businessmen the procedures to be followed in carrying out its control program until effective international control of atomic energy is established. An equipment advisory board, consisting of industry representatives, will be appointed soon, the commission stated.

Equipment to be affected by the new regulations includes radiation detection equipment, mass spectrometers, high vacuum equipment, and particle accelerators. Other types of equipment will be added to this list.

o o o

JUNKYARD VENUS: *Richard Lenoir, carrying one of his purchases, looks over some of the other pieces collected for the opening of the annual scrap iron fair on a boulevard in Paris. Once confined to old objects made of iron, the fair now includes all kinds of goods, from gas masks to statues.*

o o o



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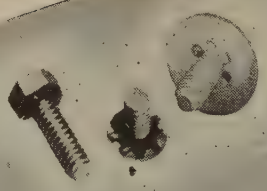
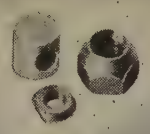


SEMS—Pre-assembled Screw and Lockwasher units



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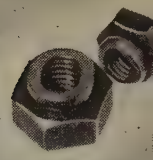
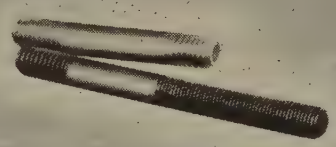
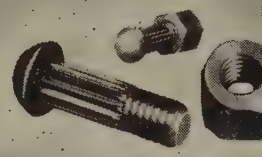


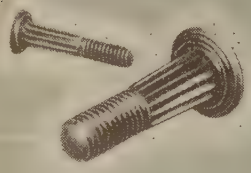
LAMSON LOCK NUTS One-piece, all-steel—can re-used repeatedly



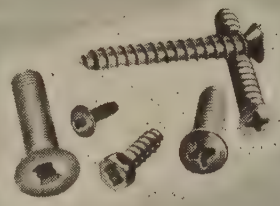
MILLED STUDS in a full range of sizes



DARDELET RIVET-BOLTS with the locking thread . . . time savers for steel construction

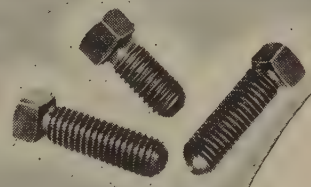


WEATHER-TIGHT Bolts—*modern* fasteners for wood assemblies—eliminate counterboring



PHILLIPS and CLUTCH RECESSED HEAD Machine Screws and Sheet Metal Screws

PLACE BOLTS—for locking assemblies rigidly



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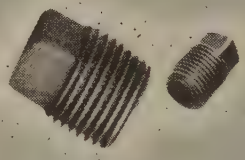
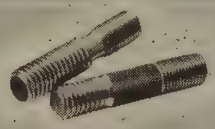
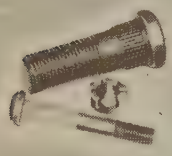


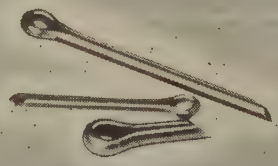
PIPE PLUGS, square head and headless; forged steel, heat-treated



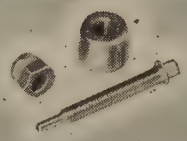
LOK-THRED Studs and Pipe Plugs—Thread *locks* and *seals* in standard tapped holes



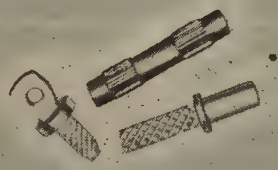
ROAD MACHINERY and other heavy equipment parts—high tensile and alloy fasteners



COTTER PINS of steel, brass, aluminum and stainless steel



BICYCLE PARTS, from axles and saddle bolts to chain-adjusting screws



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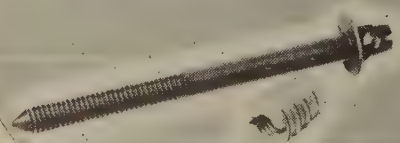

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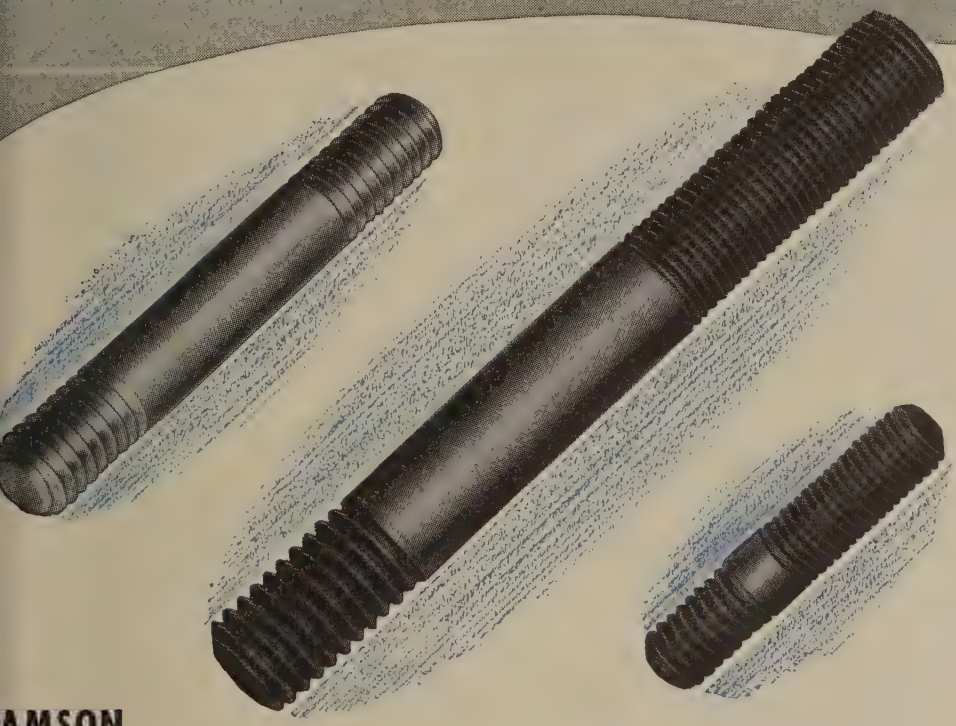

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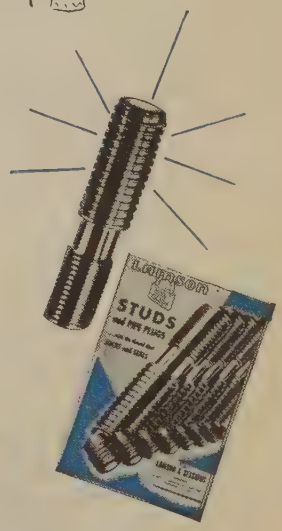

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$100,000 Donation Will Aid Research For Stronger Steel

Chicago

• • • **Chancellor Robert M. Hutchins** has disclosed that $100,000 from the Morton Butler Ryerson Memorial Fund has been given to University of Chicago to supplement its program in basic atomic research. Mr. and Mrs. Edward L. Ryerson in making the gift specified only that the money be used for research in the university's Institute of Nuclear Studies, the Institute of Metals and the Institute of Radiobiology and Biophysics.

Mr. Ryerson, one of Chicago's foremost philanthropists, is director of several industrial companies and a member of many civic organizations in that city. The memorial fund was established by Mr. Ryerson in memory of his son, a first lieutenant in the Army Air Forces killed in action at Leyte, Philippine Islands, on Dec. 6, 1944.

Chancellor Hutchins said the income from the gift would be applied immediately to the atomic program in the three institutes. "In my opinion," he added, "the most important task facing the United States today is that of maintaining leadership in science and industry. To do this we must work to maintain our preeminence in developing and controlling atomic energy."

Chancellor Hutchins previously stated that the university's Institute of Nuclear Studies is presently conducting research in an effort to determine, among other things, why steel is only one tenth as strong as the atomic theory indicates it should be (THE IRON AGE, Aug. 28, 1947).

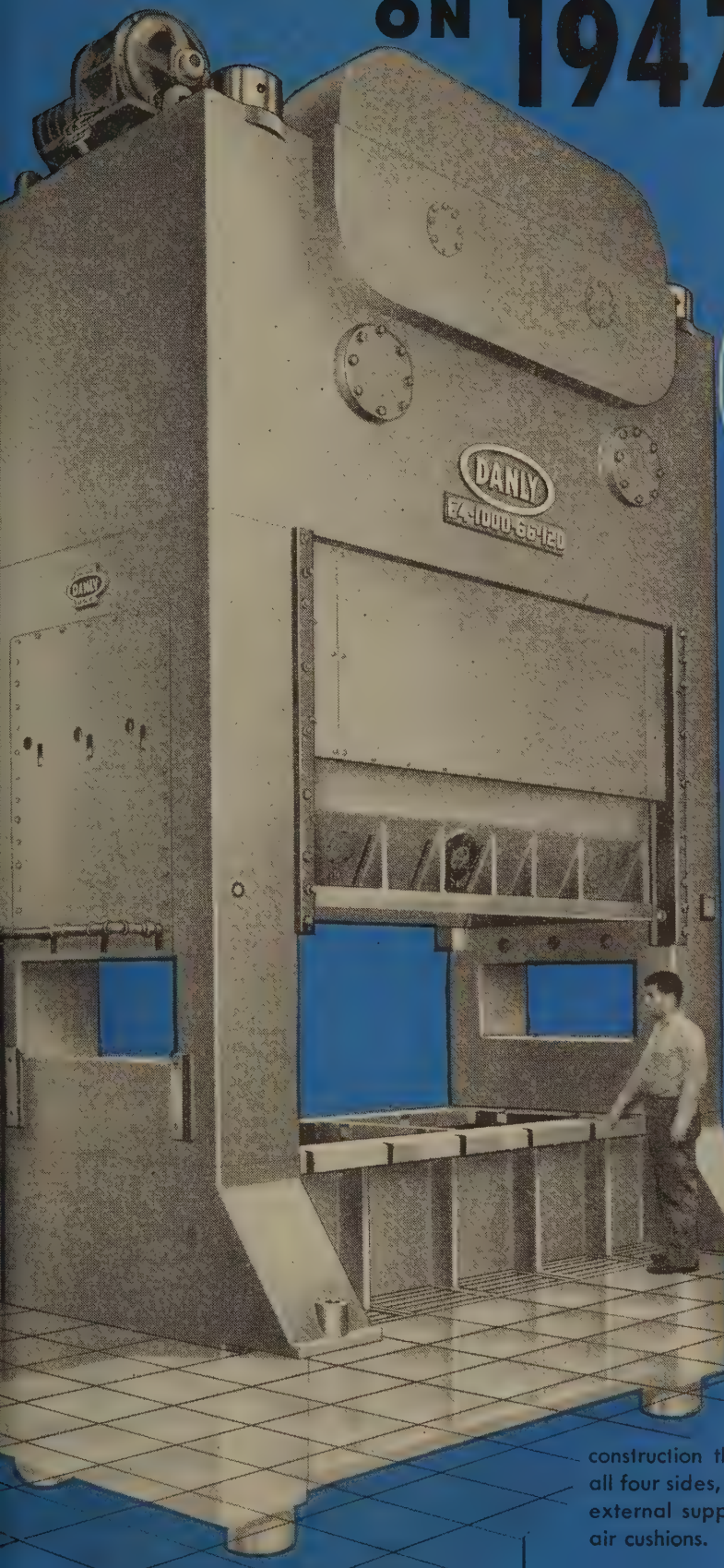
In connection with Chancellor Hutchins' statement Dr. Robert F. Mehl, head of the Dept. of Metallurgical Engineering at the Carnegie Institute of Technology, commented to THE IRON AGE that:

"Chancellor Hutchins is quite correct concerning the low value of the measured strength of metals as compared to the theoretical. This has been known a long time and has been a fascinating subject to metallurgist, for it would seem to suggest that if we knew how, we could make metals far stronger than they are now."

"Theoretically, one can calculate

MAKE 1947 PRODUCTS

ON 1947 PRESSES



1947 Product manufacture—of automobiles, washing machines, refrigerators, electric ironers—hundreds of other items for the home, shop, store and office—has become, in the main, *a matter of Stamping or Press Production.*

Consequently, the problem of greater and cheaper production of these items depends largely on improving techniques and facilities for *greater production with presses.*

The Danly Press has been designed for complete utility—designed to keep pace with the sweep of progress demonstrated in the streamlined products of 1947.

The machine tool accuracy of Danly Presses gives smoother performance, quiet operation and minimum wear—makes for faster runs, more accurate stampings, longer die life, less downtime and *greater production.*

Gears and driving members built within the crown keep out dust and other foreign material . . . Modern enclosed construction and the absence of outboard machinery promote safety, make for a neat appearance—especially in rows or batteries.

A rugged Danly Air-Friction Clutch and a Circulatory pump driven oil spray lubrication system are featured in the Danly Press.

Investigate Danly's complete line of 1, 2 and 4 point single, and double action Straight-Side Presses, and Horning, Inclinable and Gap-Frame Presses. They will put the same efficiency into your *production facilities* that you have put into your *product.*

MAKE 1947 PRODUCTS ON 1947 PRESSES

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1000-TON STRAIGHT-SIDE PRESS

This precision built 4-point Single Action Press has the clean lines, the completely enclosed construction that typify the Danly line. Readily accessible from all four sides, loading and unloading this press is not hampered by external supports or machinery. The bed is machined to receive air cushions.

DANLY . . . THE PRESS FOR MODERN PRODUCTION

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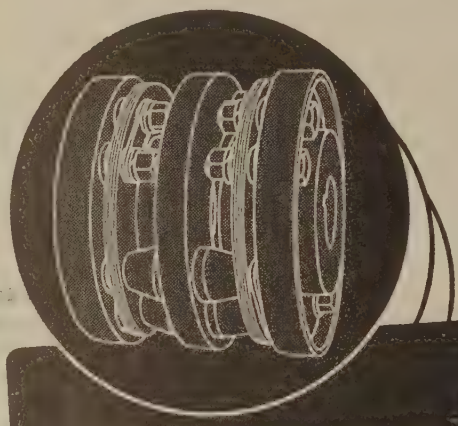
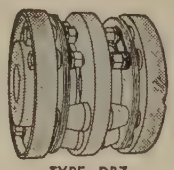
Flexible COUPLINGS
are specified by engineers wherever
100% dependability is demanded

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TYPE DSM

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Flexible COUPLINGS
provide for
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Misalignment as well
as Free End Float . . .
and Eliminate
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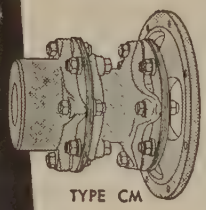
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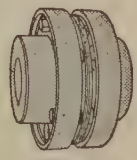
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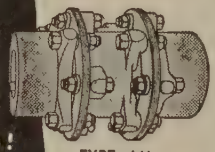
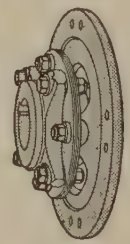

TYPE AM

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.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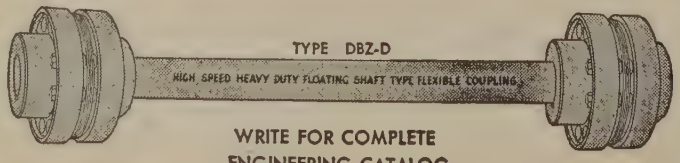


WRITE FOR COMPLETE
ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

the forces that would cause metals to yield or to break, but these calculations are all based upon the assumption that the crystalline structure of metals is quite perfect, that is, that the atoms are arranged in a perfect geometrical pattern. It was early shown that if there are many types of defects, either caused by treatment or inherent in the metal, that stress concentrations will occur causing metals to yield and to break at much lower loads."

"Measurements on the strength of glass fibers many years ago showed that fine surface cracks diminish strength to an extreme degree. There has been a great deal of research done on the natural defects of metals—those that are characteristic of metal crystals and presumably can never be removed, and there has been a great body of work done on the nature of the process of yielding, and in more recent years, on the process of breaking."

"Much of the fundamental science is still obscure. In all, however, it is building up information concerning the reasons why the strength of metals is only something like one tenth of what it should be, according to the present, greatly oversimplified theory, and it is quite possible that with this increasing knowledge, we may in time be able markedly to increase the strength of common metals."

Receives Welding Award Two Consecutive Years

Pittsburgh

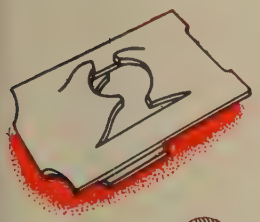
• • • **For the second year** in succession, Julius Heuschkel, welding specialist at the Westinghouse research laboratories, has won the $750 first prize in the annual contest of the Resistance Welder Manufacturers' Assn., it was announced recently by the American Welding Society.

The 1947 award, made through the society, honors Mr. Heuschkel for his paper on metallurgical aspects of carbon steel spot welding. In 1946 his paper outlining spot welding schedules for low carbon steels took top honors.

Mr. Heuschkel is the first person ever to win the award 2 years in a row.

Here's how Speed Nuts really cut costs!

ATTACHING CAGE NUTS



ATTACHING SPEED NUTS

COST REPORT

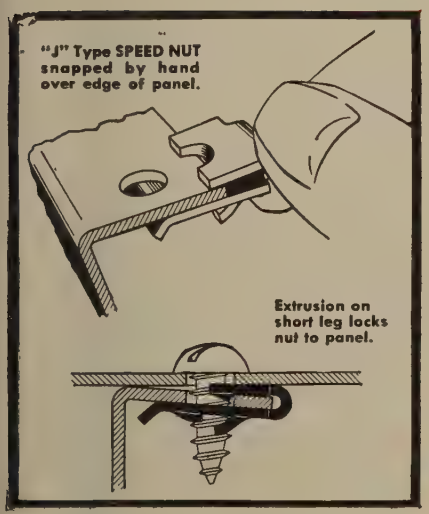
ITEM: Fastening Rear Fenders To Body

DESCRIPTION	No. per car	Material	Direct Labor	Overhead	Mfg. Cost
Cage Nut (Welding Type)	18	.1512			1512
Bolt (5/16 - 18 x 1)	18	.0918			.0918
Lock Washer	18	.0072			.0072
Plain Washer	18	0234			0234
Spot weld 9 welding nuts to R & L Wheelhouse Panels			2200	3850	.6050
Assemble R & L Fenders to Body			.1800	.3150	.4950
TOTAL for Welding Nut		.2736	.4000	.7000	1.3736
Speed Nut ("J" Type)	18	.1116			.1116
Bolt (5/16 - 10 x 5/8)	18	.0828			.0828
Plain Washer	18	.0234			.0234
Attach 9 Speed Nuts to R & L Wheelhouse Panels			.1100	.1925	.3025
Assemble R & L Fenders to Body			1350	.2363	.3713
TOTAL for Speed Nut		.2178	.2450	4288	.8916
SAVINGS		.0558	.1550	2712	.4820

Proof...that SPEED NUTS slash overhead and handling costs

- LOCK WASHER ELIMINATED
- SPOT WELDING ELIMINATED
- SPEED NUT COSTS LESS
- BOLT COSTS LESS
- LABOR COST IS LESS
- OVERHEAD IS LESS

Total saving for one operation using only 18 SPEED NUTS



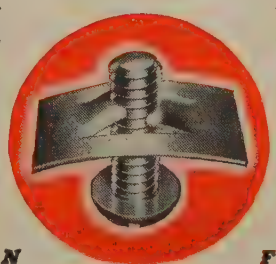
On this one simple operation, a prominent automobile manufacturer saved 48c per car by changing over to the SPEED NUT System of Fastening. Simple mathematics point out the phenomenal savings made possible by widespread use of SPEED NUT brand fasteners.

42c of this total was saved by reducing overhead and handling costs. With SPEED NUTS on the assembly line, welding machines were eliminated. Less floor space needed. Less material handling. Easier final assembly—and ⅓ of the men transferred to more productive work.

Look this report over carefully. Compare those direct labor and overhead charges and then drop us a line and find out for yourself what the SPEED NUT savings factor can do for you.

TINNERMAN PRODUCTS, INC. 2040 Fulton Road, Cleveland 13, Ohio

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S. A., Paris
In Australia: Aerocessories, Pty. Ltd., Melbourne

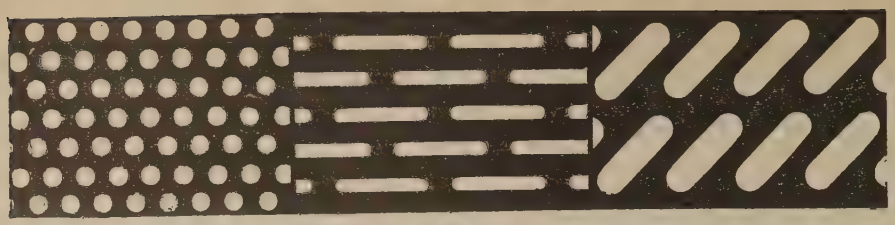


Speed Nuts* PATENTED

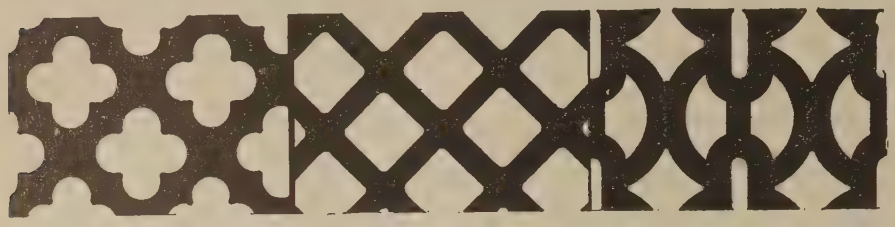
MORE THAN 4000 SHAPES AND SIZES

* Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS



For whatever purpose you need perforated metal



Hendrick will fabricate it to your specifications * * * from any commercially rolled metal * * * in any gauge * * * with any shape or size of openings. Extensive plant facilities, an unsurpassed stock of dies and tools, and more than 70 years' experience in perforating metals, are at your service.

Write us regarding your specific requirements.

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Perforated Metal Screens
Architectural Grilles
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"Shur-Site" Treads and
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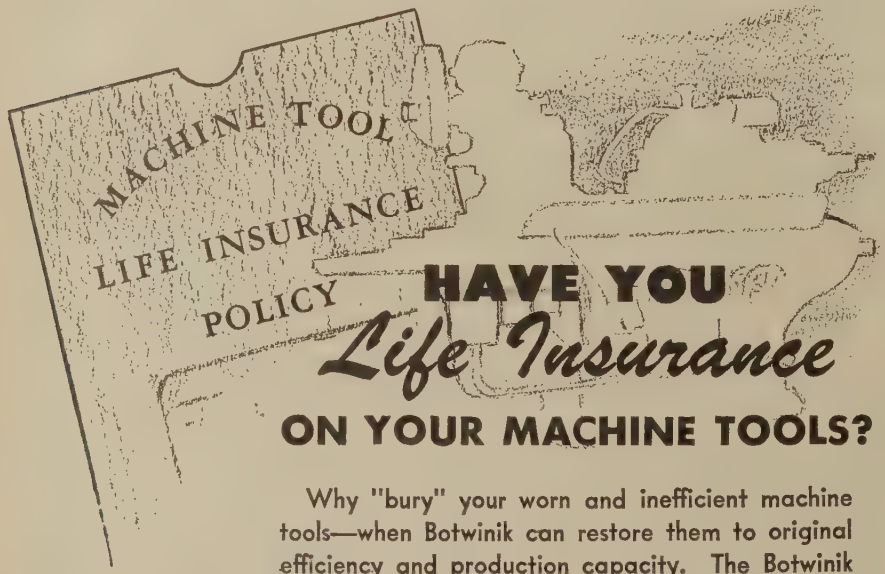
Sales Offices In Principal Cities



HAVE YOU *Life Insurance* ON YOUR MACHINE TOOLS?

Why "bury" your worn and inefficient machine tools—when Botwinik can restore them to original efficiency and production capacity. The Botwinik Plant with huge rebuilding facilities and trained personnel serves as a "Life Insurance Policy" for your Machine Tools. Your machine tools, rebuilt and guaranteed by Botwinik can give you new machine tool performance at outright savings. Write, wire or phone for complete information on Botwinik's time and money-saving rebuilding service.

Botwinik Brothers of Mass., Inc.

5 SHERMAN ST. • WORCESTER 1, MASS.

Lilienthal Says Atomic Power for Industrial Applications Remote

Washington

• • • **Industrial application** of atomic power, aside from trial demonstrations, "is certainly and definitely not near at hand," David E. Lilienthal, chairman of the Atomic Energy Commission, informed the industrial world recently.

Speaking in Detroit before the Economic Club, Mr. Lilienthal asserted that "the first commercially practical atomic power plant is not just around the corner, not around two corners." Atomic energy experts must "cut through a jungle of difficult scientific and engineering problems" before the first commercial atomic energy plant is possible, he stated.

Even after this "underbrush" is cleared away, there are "other barriers" that must be removed before as much as 10 to 20 pct of our energy supply comes from atomic energy, the former TVA chief declared. There is as yet no firm basis for estimating competitive cost position of useful power from nuclear sources with respect to the cost of generating power from conventional fuels, he said.

Mr. Lilienthal took to task the "foreign nations unfriendly to American democracy" who have criticized the U. S. monopoly of atomic energy as working to the disadvantage of Europe's fuel requirements this winter. Such criticism is "without foundation in fact," he declared. "No one can count on atomic energy to solve the fuel problems of Europe and England within the foreseeable future."

Actually, Mr. Lilienthal stated, the immediate importance of nuclear fission discoveries does not lie in the use of atomic energy as new sources of electricity and heat. The immediate importance, he said, "lies rather in the fact that here is one of the most powerful levers that has ever come to the hand of man by which he can pry open new doors of knowledge, long closed to him, new fundamental knowledge about the nature of matter and life itself."

Industrial opportunities opened

LeakProof!

The Parker 3-Piece Fitting

HOLDS BEYOND TUBE-BURSTING PRESSURES

Even if used under pressures severe enough to burst the tubing, PARKER *3-Piece* Tube Fittings remain intact . . . and do not leak or distort. Pictured is just one sample from thousands of tests that have been made—all with the same leakproof performance result.

PARKER Tube Fittings control vibration better. They're easy to assemble . . . may be reassembled repeatedly. Shapes are machined from high-strength forgings. Offered in the widest range of shapes and sizes in brass, steel, stainless steel—and aluminum. Two styles—*3-Piece* flare-type and flareless Ferulok. Warehouse stocks conveniently located in all major industrial centers.

Write today for Fittings Catalog 202, Ferulok Bulletin A-57 . . . and name of nearest distributor.

Parker

TUBE FITTINGS • VALVES

THE PARKER APPLIANCE COMPANY
17325 Euclid Avenue • Cleveland 12, Ohio

Plants: Cleveland and Los Angeles
Offices: New York, Cleveland, Chicago, Los Angeles, Dallas, Atlanta
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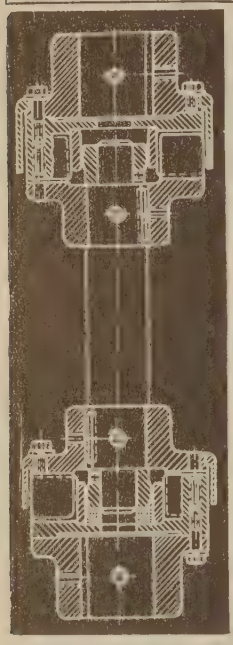
ALIGN DRIVE and DRIVEN UNITS *More Easily!*

for better correction of misalignment, shock, whip, end float, with



LOVEJOY L-R

Type "HKQ" Flexible Couplings

Large and small machines in iron and steel industries need protection afforded by LOVEJOY L-R Flexible Couplings. These rugged couplings insure constant power flow between drive and driven units, eliminate whipping of shaft ends at any speed. Quick disassembly without disturbance. 7 to 800 H.P.

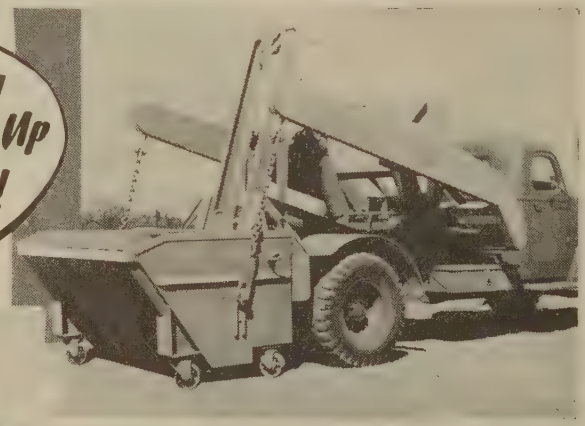
OPERATING ASSEMBLY FOR VERTICAL or HORIZONTAL HEAVY DUTIES

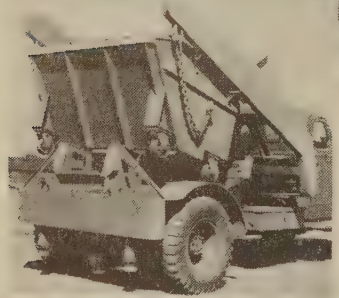
The Lovejoy L-R Type HKQ Flexible Floating Shaft Coupling is applicable to either vertical or horizontal drives at various distances. Write for catalog and selector charts to help you determine quickly, the proper couplings for every type of service.

LOVEJOY FLEXIBLE COUPLING CO. 5066 W. LAKE ST. CHICAGO 44, ILL.

Also Mfrs. of Lovejoy-IDEAL line of mechanical power transmission equipment.

Truck Bodies on Casters Speed-Up Production!





Easily rolled to any part of your plant, these 3 cu. yd. tilt type bodies speed production and cut handling costs on raw materials, finished products or waste. Any number of these or other type bodies can be handled, from your loading platform, by one Dempster-Dumpster truck hoisting unit. As shown here, loaded bodies are rolled to loading points, picked up, hauled, dumped and returned . . . a continuous cycle of operation. Standard or special bodies in 1½ to 10 cu. yd. capacity are built to handle any type of material. Cost of installing is surprisingly low. Write for catalog 247 today.

DEMPSTER DUMPSTER

TRADE MARK REG.

DEMPSTER BROTHERS, INC., 8107 Springdale, Knoxville 17, Tenn.

up by nuclear fission developments include the possibility of manufacture and sale by private industry of molecular compounds containing radioactive and stable isotopes, among them carbon, and substances now produced at Oak Ridge, he predicted. The opportunities also include the use of such radioactive tracers in industrial chemical process control and research problems, and in oil well surveys throughout the petroleum industry, as well as in hydrocarbon cracking processes for research and control.

Other opportunities lie in wait in the design of power reactors, and in the use of reactors producing beams of very high neutron intensity for the treatment of many kinds of materials, among them metals. "This may open a new era in metals for industry," Mr. Lilienthal declared, but he warned that "unless American industry and American engineering skills become an active living part of the Atomic Energy Commission's undertaking, the expectations and the needs of this country in this field will be inevitably doomed to disappointment."

Initial optimism over the possibilities of widespread industrial use of atomic energy was principally due to simple consideration of the 1 to 60 million ratio of the burning of coal to the fission of uranium, Mr. Lilienthal said.

"We know how to start a reaction and how to keep it going at a constant controllable rate," he disclosed. "The problem that remains is to convert this energy into a form suitable to provide energy to, say, a turbine, safely and efficiently. It sounds like a simple job, but in reality, as we see it now, it is one of very considerable difficulties."

Four main barriers now existing between known uses for atomic energy and contemplated widespread practical use are: (1) How to get energy in a usable form—meaning in the form of high temperature heat. (2) Producion of a reasonable rate of generation of power per unit of nuclear fuel invested. (3) Securing of adequate stocks of such fuel to activate a sizable atomic power industry. (4) Prevention of wastage or less of this precious fuel in the complex business of handling it.

Cleco Rammers

CARRY THEIR WEIGHT... JUST GUIDE 'EM TO THE WORK!

Chippers, grinders, core breakers and air line accessories are also included in the Cleco line for the foundry.

Want fast, easy-holding rammers for either floor, flask, bench or core work? You will find exactly the right model for your job in the complete Cleco line.

In addition to being great labor savers, Cleco Rammers improve casting quality by insuring uniform mold density. All models feature end pressure-seating valves that actually improve with use. The smaller models have effective poppet type throttles, while the floor models have snap throttles—both types are trouble-and-leak-proof. Large oil chambers insure efficient lubrication at all times. *Write for Bulletin 76B.*

SPECIFICATIONS

	No. 0B	No. 1	No. 4B	No. 1F	No. 4	No. 5
Length (including Butt)	17"	20½"	24"	43"	48"	49"
Weight (including Butt)	5¾ lbs.	12¼ lbs.	23½ lbs.	16 lbs.	22 lbs.	33¾ lbs.
Bore and Stroke	1" x 2"	1" x 4"	1¼" x 5"	1" x 4"	1¼" x 5"	1½" x 6"
Speed in Strokes per Minute	2500	950	950	950	950	750

Cleco DIVISION of THE REED ROLLER BIT COMPANY
P. O. BOX 2119 · · · HOUSTON 1, TEXAS

Unfilled Orders for September Hit Lowest Point for Year

• • • **Machine tool** shipments rose to $19,817,899 in September, according to a preliminary report compiled by the National Machine Tool Builders Assn.

Unfilled orders, however, hit the low point for the year to date, dropping to $117,700,906 from $122,853,741 in August. Preceding low point was June when unfilled orders totaled $120,268,031. Machine tool builders began 1947 with a backlog of $154,759,996, which has been sporadically decreasing for the past 9 months.

While September orders were very disappointing to some segments of the trade, qualified observers hold firm to the conviction that machine tool show business will not appear until October figures are released and that the last quarter will be strong.

In any event, the gradual downtrend in machine tool orders is finding a parallel in most of the other capital goods industries for the first time in many months, and it is possible that the shake-out is underway.

The spread of new firm orders in the industry is anything but even, and the same spottiness of several months ago is still the case. September for some producers was a better month than either July or August by a wide margin; others expect November to be the banner month of 1947.

In a number of cases, companies have not received nearly the volume of actual orders that had been expected after the machine tool show. At the same time, there is the largest volume of quotations out at the present time that there has been in many months.

In Detroit there is continuing evidence that the recent machine tool show at Chicago has stimulated a tremendous interest in new fully automatic equipment. While some dealers and producers have been pleasantly surprised by the volume of new business that

Some Expect November to Be '47 Banner Month For New Firm Orders

o o o

is being placed, others are inclined to observe that "there is lots of interest but there are not too many orders."

A major hurdle in purchasing new machine tool equipment appears to be the necessity in many cases of abandoning present equipment completely in order to take full advantage of new models containing multiple spindles and many other devices for speeding up the work and improving the quality of the product.

In the past a reluctance to venture too far into transfer type installations where a single breakdown might create temporarily a huge bottleneck in production lines was noted. Both machine tool builders and master mechanics are reported to have sometimes shown a reluctance to jump overboard in the direction of huge transfer machines.

It now appears, however, that this resistance is fading rapidly and transfer machines will be performing an amazingly large number of tasks on the 1948 and 1949 auto models. The trend in this direction is overwhelming and the demand for such equipment is reported to be increasing every day.

Trade reports in the East indicate that while quotations are numerous, most of them made during the Chicago show, actual sales are rare. There is no question that the show worked up a lot of enthusiasm, but when enthusiasts arrived home and asked the boss for money to buy tools, wet blankets were in order. A flat increase of 20 pct in grinding equipment prices intensified the chill.

However, the trade is busy trying to turn quotations into firm orders. It expects business will develop but there is nothing right now that suggests when better times may be expected. Not a few hope that when Congress reconvenes, something will be done about tax relief, which they say would act as a shot in the arm to the trade.

In Chicago several new machines for working metal were on display last week at the National Metal Congress and Exposition. Acme Steel Co. exhibited a machine for stitching metal to metal or to any other material that can be penetrated without cracking. Uniform stitches flow from a continuous length of wire at speeds up to 280 stitches a minute.

Cincinnati Milling Machine Co. has perfected an automatic flame hardening machine used in the hardening of metal parts for automotive and other industrial uses.

Monarch Earns $149,169

Sidney, Ohio

• • • **Net earnings of** the Monarch Machine Tool Co. for the third quarter of 1947, after taxes and other charges and subject to year-end audit and adjustment, totaled $149,169 or 71¢ per share on the 210,000 shares outstanding, it was announced today by Jerome A. Raterman, president. Net earnings for the third quarter of 1946 were $171,177 or 81¢ per share.

Net sales for the third quarter of 1947 were $1,845,184 as compared to $1,615,335 for the third quarter of last year. Net earnings for the first 9 months of 1947, after taxes and other charges and subject to year-end audit and adjustment, totaled $503,847. This is equivalent to $2.40 a share on net sales of $6,309,477 and compares with net earnings of $454,928 or $2.16 per share, on net sales of $4,922,633 for the first 9 months of 1946.

The Hardest Possible Metal Sawing

. . . cutting off test specimens in the Metallurgical Laboratory of this giant steel plant. There is no time for pampering here. Each saw must handle anything that comes, as it comes—the hardest steels and toughest alloys, in all degrees of hardness—in any size, any form or condition—because each heat, each drawing, and each forming run has to be tested.

The steel mill where these pictures were taken reports that these saws have been operating 24 hours, 7 days a week for the last five years. Maintenance cost has been practically non-existent. Furthermore, the efficiency of these saws has made possible the elimination of an equal number of other sawing machines in the department.

The answer to your cut-off problem, whether large or small, will be found in our new C48 catalog. The services of our field engineers are also available in every locality. Send for either or both now.

ARMSTRONG-BLUM MFG. CO.

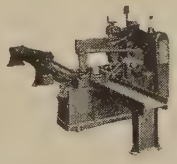
"The Hack Saw People"

5700 BLOOMINGDALE AVE. CHICAGO 39, U.S.A.

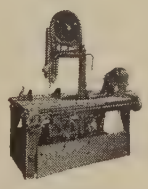
No. 1, No. 2 Series *Capacity: 4"x4" Capacity: 6"x6"*

No. 4B Series *Capacity: 6"x6"*

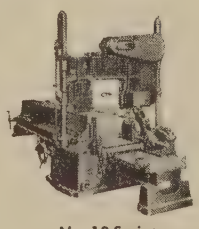
No. 6 Series *Capacity: 6"x6"*



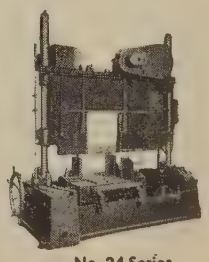
No. 9A Series *Capacity: 10"x10"*



No. 8 Series *Capacity: 18"x18"*



No. 18 Series *Capacity: 18"x18"*



No. 24 Series *Capacity: 24"x24"*

MARVEL *Metal Cutting* **SAWS**

Better Machines—Better Blades

NONFERROUS METALS

. . . News and Market Activities

Copper

• • • **There is considerable** speculation among copper consumers and dealers in scrap metals as to the possible effect of the special session of Congress in reducing the price of primary copper. Copper producers see no possibility of a decline in the copper price in view of the continued high demand from domestic consumers, coupled with a much higher range of basic cost figures, including wages, freight, machinery, oil, coal, etc. Copper producers have estimated that only Kennecott and Phelps-Dodge would be able to clear their costs today at 15¢ copper. It is estimated that 15¢ copper now would be the equivalent of 9¢ copper prewar. It is conceded by market factors that there might be leeway for some decline as the result of government pressure, but it is believed that the independent producers would be unable to make a profit and might be forced to close down their operations. Copper producers, on the other hand, forsee the possibility of greater consumption from abroad as the result of credits or dollars that may be advanced to Europe in the implementation of the Marshall Plan. At the present time the foreign market for Chilean copper is poor because of the lack of U. S. dollars. There is some probability that when dollars are made available again there may be a renewal of the tight domestic market in which consumers are unable to obtain their full requirements. This could conceivably force a higher copper price.

Producers report that wire mill demand for copper continues at peak levels, while brass mill demand is gradually improving. There is no overall decline in copper demand, although foreign business continues light. The strike prospect at Anaconda's Chile property is reported to have been killed by positive action of the Chilean government. A strike of railroad workers at Kennecott's Utah mine is reported to be still in effect.

•

Composition Grades Up

New York

• • • **There was a small** flurry of higher prices in composition and brass items here last week based on somewhat increased demand from the refineries. The increases paid by dealers ranged from ¼ to ¾¢ per lb. Dealers, who are under the impression that copper and brass scrap is undervalued relative to virgin copper, are pessimistic about an expected downtrend in scrap prices. Brass mill scrap remains without change. Dealers pessimism derives from the prospects of a virgin copper and consequently a scrap price reduction as the result of the special Congressional session to study prices. Except for a half cent increase in soft lead scrap, there were no other scrap price changes.

•

Aluminum

• • • **Aluminum producers report** a significant improvement in orders for sheets since the summer low point when the entire market for aluminum products deteriorated. Sheets are deliverable in eight to nine weeks. Most grades of foil are available in seven to eight weeks. However there is a continuing shortage of the fine gages of foil used for condensers. Deliveries of three to four weeks are obtainable on tubing, wire, rod and extrusions.

The recently announced price decreases on utility sheet and farm roofing by Reynolds Metals Co. have been canceled to some extent by increases during the week by 1¢ to 2¢ per lb. In one or two sizes, the latest increases have brought their products above the former price standard from which reductions were announced. Coiled sheet of 0.018 in. gage is several mills above 3S sheet of the same gage. These price increases were not announced to the press.

•

Metals Production In July At June Levels

Ottawa

• • • **Canadian production** of new copper in July amounted to 19,725 tons, compared with 19,396 tons in June and 15,292 tons in July 1946. For the first 7 months of this year production totaled 67,840 tons against 53,988 tons in the corresponding period last year.

Exports of copper in ore, concentrates and matte in July amounted to 1849 tons, compared with 2625 tons in June, while exports in ingots, bars, slabs and billets totaled 9763 tons against 7934 tons in the previous month.

Nickel production in July amounted to 9789 tons compared with 9835 tons in June and with 8226 tons in July 1946. Production for the first 7 months of this year totaled 67,840 tons compared with 53,988 tons in the like period last year. Exports of nickel in July amounted to 8959 tons against 9994 tons in July 1946.

July output of primary lead in all forms amounted to 14,052 tons, compared with 14,348 tons in the month immediately preceding and with 15,676 tons in July 1946. For the 7 months ending with July, production of lead totaled 93,798 tons against 108,600 tons in the like period of 1946.

Primary zinc produced in July amounted to 18,028 tons against 17,907 tons in June and 19,617 tons in July last year. For the 7 months this year, output totaled 122,585 tons compared with 141,747 tons in the 1946 period.

Output of primary silver in July amounted to 1,028,712 oz compared with 1,085,180 oz in June and 1,236,310 oz in July 1946. For the first 7 months this year, output totaled 6,607,709 oz compared with 7,737,689 oz in the like period of 1946.

Nonferrous Metals Prices

Cents per pound

	Oct. 22	Oct. 23	Oct. 24	Oct. 25	Oct. 27	Oct. 28
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	80.00	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point, freight allowed 15.00
Aluminum pig, f.o.b. shipping point 14.00
Antimony, American Laredo Tex... 33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.....$17.00
Beryllium aluminum 5% Be, dollars per lb contained Be.....$35.50
Cadmium, del'd $1.75
Cobalt, 97-99% (per lb)....$1.65 to $1.72
Copper electro, Conn. Valley..... 21.50
Copper, lake, Conn. Valley 21.625
Gold, U. S. Treas., dollars per oz..$35.00
Indium, 99.8%, dollars per troy oz. $2.25
Iridium, dollars per troy oz....$80 to $90
Lead, St. Louis 14.80
Lead, New York 15.00
Magnesium, 99.8+% 20.50
Magnesium, sticks, carlots 36.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$81 to $83
Nickel, electro, f.o.b. New York... 37.67
Palladium, dollars per troy oz. $24.00
Platinum, dollars per troy oz...$59 to $62
Silver, New York, cents per oz... 71.375
Tin, Straits, New York..... 80.00
Zinc, East St. Louis 10.50
Zinc, New York 11.06
Zirconium copper, 6 pct Zr. per lb contained Zr $8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot
No 115 ..... 17.50-18.00
No. 120 ..... 17.00-17.50
No. 123 ..... 16.50-17.00
80-10-10 ingot
No. 305 ..... 21.50-22.00
No. 215 ..... 19.50-20.00
88-10-2 ingot
No. 210 ..... 27.25-27.75
No. 215 ..... 25.75-26.25
No. 245 ..... 19.75-20.25
Yellow ingot
No. 405 ..... 13.75-14.50
Manganese Bronze
No. 421 ..... 15.75-16.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:
0.30 copper, max. 15.75
0.60 copper, max. 15.50
Piston alloys (No. 122 type) 14.00 to 14.50
No. 12 alum. (No. 2 grade)..... 13.75
108 alloy 14.00
195 alloy 14.75
AXS-679 ..... 14.25
Steel deoxidizing aluminum, notch-bar, granulated or shot
Grade 1—95 pct-97½ pct 14.50
Grade 2—92 pct-95 pct 12.75
Grade 3—90 pct-92 pct 12.00-12.25
Grade 4—85 pct-90 pct 11.50-11.75

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed
Cast, oval, 15 in. or longer..... 37⅝
Electrodeposited 32.34
Rolled, oval, straight, delivered.. 32.59
Brass, 80-20, frt allowed
Cast, oval, 15 in. or longer 33⅝
Zinc, Cast, 99.99 ..... 18¾
Nickel, 99 pct plus, frt allowed
cast 51
Rolled, depolarized 52
Silver 999 fine
Rolled, 1000 oz. lots, per troy oz. 67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum..... 43.00
Copper sulphate, 99.5, crystals, bbls 11.50
Nickel salts, single, 425 lb bbls, frt allowed 14.50
Silver cyanide, 100 oz. lots, per oz. 54.00
Sodium cyanide, 96 pct, domestic, 200 lb drums 15.00
Zinc cyanide, 100 lb drums 34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed 7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam. rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 18, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢ 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l. 15.50
Ribbon, ton lots 14.50
Plates
Small 13.50
Large, over 12 in. 14.50

Copper, Brass, Bronze

(Cents per pound, f.o.b. mill effective June 11)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.00
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings 14½
Loose yellow brass trimmings 15½

Copper and Brass

No. 1 heavy copper and wire 15½—16
No. 2 heavy copper and wire 14½—15
Light copper ..... 13 —13½
Auto radiators (unsweated). 8¼— 8¾
No. 1 composition ..... 11 —11½
No. 1 composition turnings.. 10½—11
Clean red car boxes..... 9 — 9¼
Cocks and faucets ..... 8¾— 9¼
Mixed heavy yellow brass... 6½— 7
Old rolled brass ..... 7 — 7½
Brass pipe ..... 8¼— 8¾
New soft brass clippings .... 11 —11½
Brass rod ends ..... 8½— 9
No. 1 brass rod turnings ... 8 — 8½

Aluminum

Alum. pistons free of struts.. 3½— 4
Aluminum crankcases ..... 5½— 6
2S aluminum clippings ..... 8 — 8½
Old sheet & utensils ..... 5½— 6
Mixed borings and turnings.. — 2
Misc. cast aluminum ..... 5 — 5½
Dural clips (24S) ..... 4½— 5

Zinc

New zinc clippings ..... 5½— 6
Old zinc ..... 4¼— 4½
Zinc routings ..... 2½— 3
Old die cast scrap ..... 2½— 3

Nickel and Monel

Pure nickel clippings ..... 15½—17½
Clean nickel turnings ..... 14 —15
Nickel anodes ..... 16 —17
Nickel rod ends ..... 16 —17
New Monel clippings ..... 12 —13
Clean Monel turnings ..... 7 — 8
Old sheet Monel..... 10 —10½
Old Monel castings ..... 7½— 8
Inconel clippings ..... 8 — 8½
Nickel silver clippings, mixed 7½— 8
Nickel silver turnings, mixed 5½— 6

Lead

Soft scrap lead ..... 10½—11
Battery plates (dry) ..... 5 — 5½

Magnesium Alloys

Segregated solids ..... 6½— 7
Castings ..... 4½— 5½

Miscellaneous

Block tin ..... 63 —65
No. 1 pewter ..... 48 —50
No. 1 auto babbitt ..... 38 —40
Mixed common babbitt ..... 11½—12
Solder joints ..... 13 —13½
Siphon tops ..... 38 —39
Small foundry type ..... 13 —13½
Monotype ..... 12 —12½
Lino and stereotype ..... 11½—12
Electrotype ..... 9½—10
New type shell cuttings ..... 11 —11½
Clean hand picked type shells 4½— 5
Lino and stereo dross ..... 5 — 5½
Electro dross ..... 3 — 3¼

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect
Freight equalized with nearest free delivery point.
Full lead sheets 18.25
Cut lead sheets 18.75
Lead pipe, manufacturing point ... 17.50
Lead traps and bends.....List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules ....List +42%
Lead wool 19.50

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UNITED STATES STEEL

Activity Levels But Prices Remain Strong

New York

• • • **The scrap markets** these days are subject to many factors not heretofore present. After a flurry of buying last week most large consumers have withdrawn from the market. Just how long they can stay out is problematical.

In the Pittsburgh district a sale of scrap was made late last week at $40.00 but this by no means reflects what the market is there. Out-of-district scrap has been increasing in volume to the Pittsburgh district. Also the hair-splitting on definitions has given rise to "semi-remote" heavy melting.

This in terms of the Pittsburgh scrap market can hardly be ignored in naming the price delivered to the Pittsburgh district. Nor can the distant scrap coming into Pittsburgh be ignored. For that reason the quotations this week for Pittsburgh cover the latest batch of factors determining the delivered price there.

Watching and waiting seems to be the attitude at other areas, although at Philadelphia the market is up on broker strength and at Chicago sales late last week have forced the price up there since representative tonnages at lower figures have not been purchased.

While buying remained fastidious in the consuming area proper, the strong buying in outlying areas continued this week. Boston and New York rested at new prices higher than previous levels. THE IRON AGE scrap composite price hit a new high of $42.58 this week for the second successive week.

•

PITTSBURGH—A substantial purchase of openhearth steel scrap last week sent the price of local material here to $43, while that from not far out from Pittsburgh was bought at $45. For more distant material the reported price was $47. A few days later this same buyer bought locally for $40. Owing to the amount and the price of material bought from outside the district in the past week the openhearth steel market is quotable this week at $40 to $45. The former represents buying of local material; the $45 price is representative of the delivered price of material originating outside the district. In fact the $45 figure is reported to have been paid for a new classification, "semi-remote," i. e. material not normally considered as out of district scrap. The top price on low phos advanced $2, as did that for No. 1 cupola cast.

•

CHICAGO—The latest price maneuver by the mills has most people baffled. Consensus is that the implications are much more far reaching than appears on the surface and that the government was in some way partly responsible for the move. Regardless, the tonnage sold at $43 was in large volume with some brokers refusing to commit themselves for as much as the mills wanted to buy. At the moment all mills have in effect dropped out of the market and the future trend of price must await the next representative purchase.

•

CLEVELAND—While mills in a nearby basing point went out last week and paid more than quoted prices, and then dropped out of the market, only effect of the manufactured "drop" has been to leave some consumers high and dry for scrap. Very little local scrap can be had at quoted prices, and in fact, dealers and brokers are very wary of the market. Remote material is moving into basing points at prices as high as $47. Market conditions are very unsettled at the moment, and assorted prices are being paid for similar grades.

•

BOSTON—When steel mills last week announced they were out of the market, the market here went dead. Previously heavy steel was up all of $4 from the previous week's close, other grades of scrap about $3 and chemical borings $4. Last Friday when a $40 market was established at Pittsburgh, $36 was paid here for eastern Pennsylvania delivery, down $2.50 from the previous peak. Since then $38 has been paid for same delivery.

•

NEW YORK—After days of widely varying price activity last week, the highest levels were reduced at midweek and No. 1 scrap was quotable at $38 to $39. Shipments were improving slightly, and moving mostly to Eastern Pennsylvania. Cast grades remained at their levels of last week while the steel scrap was moving up.

•

PHILADELPHIA—The heavy melting market was stronger here last week on the basis of broker purchases and an analysis of the market position. All mills are reported to have withdrawn from the market by Friday. Heavy melting grades are quoted in the range of $42 to $43. Turnings grades are also $1 higher. Cast scrap grades are higher, caused largely by increased demand due to the shutting down of the large Alan Wood furnace. One consumer of chemical borings has increased its buying differential above OPA's former price to $20 per ton. Low phos grades were also higher last week.

•

DETROIT—Detroit is still dazed by the strange gyrations of the scrap market during the past week when mill buying prices were raised $3 per ton in outside markets and then reduced to previous levels within a few hours. Although some sources report that substantial tonnages were bought in outside markets at the higher prices, the tonnages contracted for in Detroit are reported to be small. Some Detroit brokers, it is reported, did not participate at the higher price levels; the tonnage purchased by local mill buyers is reported to be small and definitely not in excess of normal requirements.

•

BUFFALO — The ups and downs of other markets stirred up little more than a flock of new rumors here during the past week as local mills held aloof and openhearth grades were nominally unchanged at $37 to $38. The plus rating of Buffalo as a scrap center was lowered sharply however by diversion to Pittsburgh and the Valley of much of the material originating at Rochester and points east. Outside brokers were reported paying over the Buffalo delivered price for steelmaking scrap at Rochester. Local trade ideas of price were substantially above $38 and the undertone of the market was still firm to strong. Machine shop turnings and short shovelings added another $2 on sales to the Falls.

•

CINCINNATI — Cincinnati brokers in this city report that there has been an upheaval in the market. While last week the prices tended higher and there was great activity in the market on Thursday it virtually ceased, with everyone running out. Blame for this is questionable.

•

BIRMINGHAM—Sales here last week moved up to a top of $38 and about 75 pct of the material moving in this district is at that price. The largest consumer in the area is now offering $35, but this price had not yet been tested at midweek.

•

TORONTO — New Canadian ceiling prices on steel scrap have provided no inducement to broad scale collections and offerings are showing little improvement. Only occasional shipments are reported from the rural districts and there is a general lack of collectors in the farm communities. Consumers are not quibbling over price, but are paying top ceiling for all available supply. With the ceiling and controls off iron scrap, No. 1 cast is now commanding the same price as pig iron and dealers with this material on hand have no difficulty in obtaining $40 per gross ton.

PITTSBURGH

Per gross ton delivered to consumer*:

No. 1 hvy. melting	$40.00 to $45.00
RR. hvy. melting	42.50 to 43.50
No. 2 hvy. melting	40.00 to 45.00
RR. scrap rails	47.50 to 48.50
Rails 2 ft. and under	51.00 to 52.00
No. 1 comp'd bundles	40.00 to 45.00
Hand bdld. new shts.	40.00 to 45.00
Hvy. axle turn.	.... 39.50
Hvy. steel forge turn.	.... 39.50
Mach. shop turn.	35.00 to 35.50
Shoveling turn.	36.50 to 37.00
Mixed bor. and turn.	35.00 to 35.50
Cast iron borings	35.50 to 36.00
No. 1 cupola cast.	47.00 to 48.00
Hvy. breakable cast.	.... 39.00
Malleable	55.00 to 56.00
RR. knuck. and coup.	51.00 to 52.00
RR. coil springs	50.00 to 51.00
RR. leaf springs	51.00 to 52.00
Rolled steel wheels	51.00 to 52.00
Low phos.	47.00 to 48.00

*See box on this page.

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
No. 2 hvy. melting	42.50 to 43.00
No. 1 bundles	42.50 to 43.00
No. 2 dealers' bundles	42.50 to 43.00
Bundled mach. shop turn.	42.50 to 43.00
Galv. bundles	40.50 to 41.00
Mach. shop turn.	35.00 to 37.00
Short shov. turn.	38.50 to 40.00
Cast iron borings	37.00 to 38.00
Mix. borings & turn.	35.00 to 37.00
Low phos, hvy. forge	47.50 to 48.00
Low phos, plates	45.00 to 45.50
No. 1 RR. hvy. melt.	46.00 to 47.00
Rerolling rails	55.50 to 56.50
Miscellaneous rails	49.50 to 50.50
Angles & splice bars	50.00 to 50.50
Locomotive tires, cut	48.00 to 48.50
Cut bolster & side frames	48.00 to 48.50
Standard stl. car axles	55.50 to 56.00
No. 3 steel wheels	47.50 to 48.00
Couplers & knuckles	48.00 to 48.50
Rails 2 ft. and under	55.00 to 55.50
Malleable	64.00 to 65.00
No. 1 mach. cast.	52.00 to 53.00
No. 1 agricul. cast.	49.00 to 50.00
Hvy. breakable cast.	41.50 to 42.00
RR. grate bars	46.00 to 47.00
Cast iron brake shoes	46.50 to 47.00
Cast iron carwheels	45.50 to 46.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	39.00 to 40.00
Mach. shop turn.	29.50 to 30.00
Shoveling turn.	31.50 to 32.00
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	29.00 to 30.00
Low phos. plate	40.00 to 41.00
No. 1 cupola cast.	45.00 to 46.00
Hvy. breakable cast.	36.00 to 37.00
Scrap rails	40.00 to 41.00

BOSTON

Dealers' buying prices per gross ton. f.o.b. cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	36.00 to 38.00
Nos. 1 and 2 bundles	36.00 to 38.00
Busheling	36.00 to 38.00
Shoveling turn.	33.00 to 34.00
Machine shop turn.	31.00 to 31.50
Mixed bor. & turn.	31.00 to 31.50
Cl'n cast. chem. bor.	34.00 to 34.50
No. 1 machinery cast.	43.00 to 44.00
No. 2 machinery cast.	43.00 to 44.00
Heavy breakable cast.	39.00 to 40.00
Stove plate	39.00 to 40.00

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy, melting	$34.25 to $35.25
No. 2 hvy. melting	34.25 to 35.25
No. 1 bundles	34.25 to 35.25
New busheling	34.25 to 35.25
Flashings	34.25 to 35.25
Mach. shop turn.	30.00 to 31.00
Shoveling turn.	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Mixed bor. & turn.	31.00 to 32.00
Low phos. plate	39.75 to 40.75
No. 1 cupola cast	44.00 to 45.00
Hvy. breakable cast.	37.00 to 38.00
Stove plate	37.00 to 38.00
Automotive cast.	44.00 to 45.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	42.00 to 43.00
Mach. shop turn.	33.00 to 34.00
Shoveling turn.	33.00 to 34.00
Mixed bor. & turn.	33.00 to 34.00
Clean cast chemical bor.	38.00 to 40.00
No. 1 machinery cast.	52.00 to 54.00
No. 1 mixed yard cast.	49.00 to 50.00
Hvy. breakable cast.	48.00 to 49.00
Clean auto cast.	52.00 to 54.00
Hvy. axle forge turn.	42.00 to 43.00
Low phos. plate	46.50 to 47.50
Low phos. punchings	46.50 to 47.50
Low phos. bundles	45.00 to 46.00
RR. steel wheels	48.00 to 49.00
RR. coil springs	48.00 to 49.00
RR. malleable	**58.00 to 60.00**

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. Where substantial tonnages of open hearth grades come into a consuming district from outside of that district, the upper range of the price quoted here is the representative average delivered price of the bulk of this incoming material; the lower range shows the price being paid for scrap originating within the consuming district.

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	**$40.00 to $41.00**
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	26.00 to 27.00
Locomotive tires, uncut	45.00 to 46.00
Mis. std. sec. rails	51.00 to 52.00
Rerolling rails	55.00 to 56.00
Steel angle bars	46.00 to 47.00
Rails 3 ft. and under	47.00 to 48.00
RR. steel springs	46.00 to 47.00
Steel car axles	46.00 to 47.00
Grate bars	40.00 to 41.00
Brake shoes	41.00 to 42.00
Malleable	61.00 to 62.00
Cast iron car wheels	44.00 to 45.00
No. 1 machinery cast	44.00 to 45.00
Hvy. breakable cast.	**38.00 to 39.00**

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	37.00 to 38.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	37.00 to 38.00
Long turnings	23.00 to 24.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	**24.00 to 25.00**
Bar crops and plate	**38.00 to 38.50**
Structural and plate	**38.00 to 38.50**
No. 1 cupola cast.	**44.00 to 45.00**
Stove plate	**42.00 to 42.50**
No. 1 RR. hvy. melt.	**36.00 to 37.00**
Steel axles	**38.00 to 39.00**
Scrap rails	**37.50 to 38.00**
Rerolling rails	**41.00 to 42.00**
Angles & splice bars	**40.00 to 41.00**
Rails 3 ft. & under	**40.00 to 41.00**
Cast iron carwheels	**35.00 to 36.00**

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	36.50 to 37.00
Short shov. turn.	38.50 to 39.00
Cast iron borings	34.50 to 35.00
Low phos	46.00 to 46.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 bundles	38.00 to 39.00
Comp. galv. bundles	36.00 to 37.00
Mach. shop turn.	29.50 to 30.00
Mixed bor. & turn.	29.50 to 30.00
Shoveling turn.	30.50 to 31.00
No. 1 cupola cast.	43.50 to 44.00
Hvy. breakable cast.	43.50 to 44.00
Charging box cast.	43.50 to 44.00
Stove plate	43.50 to 44.00
Clean auto cast.	43.50 to 44.00
Unstrip. motor blks.	40.50 to 41.50
Cl'n chem. cast bor.	33.50 to 34.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	**37.00 to 38.00**
No. 1 bundles	**37.00 to 38.00**
No. 2 bundles	**37.00 to 38.00**
No. 1 busheling	**37.00 to 38.00**
Mach. shop turn.	32.50 to 33.50
Shoveling turn.	34.50 to 35.50
Cast iron borings	31.50 to 32.50
Mixed bor. & turn.	31.50 to 32.50
No. 1 cupola cast	42.00 to 44.00
Charging box cast.	38.00 to 40.00
Stove plate	41.00 to 42.00
Clean auto cast.	42.00 to 44.00
RR. Malleable	50.00 to 55.00
Small indl. malleable	**39.00 to 41.00**
Low phos. plate	43.00 to 44.00
Scrap rails	47.00 to 48.00
Rails 3 ft. & under	50.00 to 52.00
RR. steel wheels	46.00 to 48.00
Cast iron carwheels	46.00 to 48.00
RR. coil & leaf spgs.	**46.00 to 48.00**
RR. knuckles & coup.	**46.00 to 48.00**

CLEVELAND

Per gross ton delivered to consumer:*

No. 1 hvy. melting	$39.00 to $42.50
No. 2 hvy. melting	39.00 to 42.50
No. 1 bundles	39.00 to 42.50
No. 2 bundles	39.00 to 42.50
No. 1 busheling	39.00 to 42.50
Drop forge flashings	39.00 to 42.50
Mach. shop turn.	36.00 to 36.50
Shoveling turn.	38.00 to 38.50
Steel axle turn.	39.00 to 42.50
Cast iron borings	34.00 to 34.50
Mixed bor. & turn.	34.00 to 34.50
Low phos.	43.00 to 43.50
No. 1 machinery cast.	48.00 to 50.00
Malleable	58.00 to 60.00
RR. Cast.	48.00 to 50.00
Railroad grate bars	42.00 to 44.00
Stove plate	**42.00 to 44.00**
RR. hvy. melting	**40.50 to 41.00**
Rails 3 ft. & under	50.00 to 51.00
Rails 18 in. & under	53.00 to 54.00

* See box on this page.

SAN FRANCISCO

Per gross ton f.o.b. shipping point

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	25.00
No. 2 bales	25.00

Per gross ton delivered to consumer

No. 3 bales	$19.50
Mach. shop turn.	16.00
Elec. furn. 1 ft. und	$32.00 to 34.00
No. 1 cupola cast.	32.00 to 33.00
RR. hvy. melting	26.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	25.00
No. 1 bales	25.00
No. 2 bales	25.00
No. 3 bales	19.00
Mach. shop turn.	16.50
No. 1 cupola cast.	**$32.00 to 33.00**
RR. hvy. melting	26.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	**$22.00 to $24.00**
Elec. furn. 1 ft. and und.	**27.00 to 28.50**
No. 1 cupola cast.	27.50
RR. hvy. melting	25.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point

Heavy melting	$22.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact., prep'd	21.00*
Bushelings, new fact., unprep'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	36.00 to 40.00

*Ceiling Price.

Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Oct. 28, 1947	Oct. 21, 1947	Sept. 30, 1947	Oct. 29, 1946
Hot-rolled sheets	2.80	2.80	2.80	2.425
Cold-rolled sheets	3.55	3.55	3.55	3.275
Galvanized sheets (10 ga.)	3.95	3.95	3.95	4.05*
Hot-rolled strip	2.80	2.80	2.80	2.45
Cold-rolled strip	3.55	3.55	3.55	3.05
Plates	2.95	2.95	2.95	2.50
Plates wrought iron	6.85	6.85	6.85	4.112
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.30
*24 gage				
Tin and Terneplate. (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.50
Cold-finished bars	3.55	3.55	3.55	3.10
Alloy bars	3.30	3.30	3.30	2.92
Structural shapes	2.80	2.80	2.80	2.35
Stainless bars (No. 302).	26.00	26.00	26.00	25.97
Wrought iron bars	7.15	7.15	7.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.05
Wire nails	4.25	4.25	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$43.39*
Light rails	3.10	3.10	3.10	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$39.00
Sheet bars	66.00	66.00	66.00	38.00
Slabs, rerolling	45.00	45.00	45.00	39.00
Forging Billets	55.00	55.00	55.00	47.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.30
Skelp	2.60	2.60	2.60	2.05

Pig Iron: (per gross ton)	Oct. 28, 1947	Oct. 21, 1947	Sept. 30, 1947	Oct. 29, 1946
No. 2, foundry, Phila.	$41.36	$41.36	$41.22	$30.43
No. 2, Valley furnace	36.50	36.50	36.50	28.50
No. 2, Southern Cin'ti	40.24	40.24	39.75	27.80
No. 2, Birmingham	34.88	34.88	34.88	24.88
No. 2, foundry, Chicago†	36.00	36.00	36.00	28.50
Basic del'd Philadelphia	40.86	40.86	40.72	29.93
Basic, Valley furnace	36.00	36.00	36.00	28.00
Malleable, Chicago†	36.50	36.50	36.50	28.50
Malleable, Valley	36.50	36.50	36.50	28.50
Charcoal, Chicago	50.04	50.04	49.49	42.34
Ferromanganese‡	145.00	145.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh	$42.50	$42.25	$37.75	$20.00
Heavy melt'g steel, Phila.	42.50	41.50	36.75	18.75
Heavy melt'g steel, Ch'go	42.75	41.75	38.75	18.75
No. 1, hy. comp, sheet, Det.	34.75	37.25	34.50	17.32
Low phos. Youngs'n	46.25	46.25	44.50	22.50
No. 1, cast, Pittsburgh	47.50	45.50	43.00	25.00
No. 1, cast, Philadelphia.	53.00	51.50	47.50	25.00
No. 1, cast, Chicago	52.50	52.50	49.50	25.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.50	$12.50	$12.00	$8.75
Foundry coke, prompt	14.00	14.00	13.75	8.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	21.50	14.375
Copper, Lake, Conn.	21.625	21.625	21.625	14.375
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	9.25
Lead, St. Louis	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of **Apr. 22, 1943**, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Oct. 28, 1947	3.19141¢ per lb.	$36.96 per gross ton.	$42.58 per gross ton.
One week ago	3.19141¢ per lb.	$36.96 per gross ton.	$41.83 per gross ton.
One month ago	3.19141¢ per lb.	$36.93 per gross ton.	$37.75 per gross ton.
One year ago	2.73011¢ per lb.	$28.13 per gross ton.	$19.17 per gross ton.

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	3.19141¢ Aug. 5	2.87118¢ Jan. 7	$37.35 Aug. 19	$30.14 Jan. 7	$41.67 Aug. 5	$29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices: includes 3 pct freight tax. (15) to 0.035 to 0.075 in. thick by ⅝ to 3½ in. wide. (16) Spot market as high as $92 gross ton. (17) Delivered Los Angeles: add ½c per 100 lb for San Francisco. (18) Slab prices subject to negotiation in most cases. Some producers charge (19) $2 more, (21) $1 more. Some producers charge (22) 0.05¢ less, (23) 0.10¢ less, (24) 0.20¢ less.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS Carbon, rerolling	($36.00 f. o. b. mill) (Spot market as high as $80 gross ton)														
Carbon, forging	$46.00														
Alloy	$56.00									(Canton = $56.00)					
BILLETS, BLOOMS, SLABS Carbon, rerolling [18]	$45.00[19]	$45.00[19]	$45.00[19]	$47.00	$45.00[19]	$45.00[19]							$48.00[19]		
Carbon, forging billets	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00							$58.00		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)						$69.00		
SHEET BARS[16]							$66.00								
PIPE SKELP	2.60¢[21]	2.65¢					2.60¢[21]	2.60¢[21]							
WIRE RODS	2.80¢[21]	2.80¢[21]		2.80¢[21]	2.85¢		(Worcester = 2.90¢[21])					3.52¢[13]			
SHEETS Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	3.175¢	(Ashland, Ky. = 2.80¢)		3.54[17]¢	2.95¢	3.12¢	3.02¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.70¢	3.98¢	3.97¢
Galvanized (10 gage)	3.95¢[23]	3.95¢[23]	3.95¢[23]		3.95¢[23]		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland = 3.95¢)	4.62¢[17]		4.27¢	4.17¢
Enameling (12 gage)	3.95¢[22]	3.95¢[22]	3.95¢[22]	3.95¢			3.95¢		4.05¢	3.95¢			4.10¢[22]	4.42¢	4.37¢
Long ternes [2] (10 gage)	4.05¢[24]	4.05¢[24]	3.85¢											4.52¢	4.47¢
STRIP Hot-rolled [3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60¢[17]	2.95¢	3.27¢	3.22¢
Cold-rolled [4]	3.55¢	3.65¢		3.55¢			3.55¢			(Worcester = 3.75¢)			3.70¢	4.02¢	3.97¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.57¢	
TINPLATE Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio = $5.75)		$6.217		$6.082[11]
Electro, box 0.25 lb.	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb.	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb.	Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage[5]	3.90¢	3.90¢	3.90¢		4.00¢			4.00¢	4.00¢					4.32¢	4.22¢
BLACKPLATE, CANMAKING 55 lb. to 70 lb.	Deduct $1.55 from standard coke base box.														
75 lb. to 95 lb.	Deduct $1.65 from standard coke base box.														
100 lb. to 118 lb.	Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢[17]	3.05¢	3.314	3.32¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[17]		3.07¢	2.97¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.70¢	3.98¢	3.97¢
Alloy, hot-rolled	3.30¢	3.30¢				3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)					3.45¢		3.45¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢							4.25¢		
PLATE Carbon steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	(Coatesville = 3.15¢, Claymont = 3.15¢, Geneva, Utah = 2.95¢)				3.76[14]¢	3.10¢) 3.27¢		3.17¢
Floor plates	4.20¢	4.20¢												4.67¢	4.62¢
Alloy	3.80¢	3.80¢			(Coatesville = 4.50¢)									4.27¢	4.02¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 3.95¢, Bethlehem = 2.80¢)					3.43¢[10]		3.02¢	2.95¢
SPRING STEEL, C-R 0.08 to 0.40 carbon	3.55¢			3.55¢			(Worcester = 3.75¢)								
0.41 to 0.60 carbon	5.05¢			5.05¢			(Worcester = 5.25¢)								
0.61 to 0.80 carbon	5.65¢			5.65¢			(Worcester = 5.85¢)								
0.81 to 1.05 carbon	7.15¢			7.15¢			(Worcester = 7.35¢)								
1.06 to 1.35 carbon	9.45¢			9.45¢			(Worcester = 9.65¢)								
MANUFACTURERS' WIRE[9] Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		3.99¢	3.97¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)							5.28¢[13]		5.04¢	4.96¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.71¢	3.72¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base Per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	17¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.75
Angle splice bars, 100 lb	3.25
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$3.10
Light rails (from rail steel), f.o.b. Williamsport, Pa.	3.45

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.05¢
Tie plates, Fittsburg, Calif.	3.20¢
Track bolts	7.00¢
Track bolts, heat treated, to rail roads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio; Weirton, W. Va.; St. Louis, Kansas City, Minnequa, Colo.; Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard & coated nails	$4.25†	$5.33
Galvanized nails‡‡	4.00†	5.08
Cut nails, carloads, Pittsburgh base	5.80*	....

†10¢ additional at Cleveland, 35¢ at Worcester. ‡‡ Plus $2.75 per 100 lb galvanizing extra. *Less 20¢ to jobbers.

	Base per 100 lb	
Annealed fence wire	$4.20‡	$5.21
Annealed galv. fence wire	4.65‡	5.66

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base	column
Woven wire fence*	91	114
Fence posts, carloads	90††	...
Single loop bale ties	91	115
Galvanized barbed wire**	101	121
Twisted barbless wire	101	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	5.30	5.30	5.30	5.30	5.30
Galvanized	....	5.85	....	....	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Cold-rolled	....	....	....	....	....	....	....	....	....
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
½-in.	50½	34½
¾-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in.	58	43½
Wrought Iron, buttweld		
½-in.	+ 7	+29
¾-in.	2½	+19
1 and 1¼-in.	8	+11
1½-in.	13½	+ 7½
2-in.	14	+ 7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+ 5
4½ to 8-in.	10	+ 6½

Extra Strong, plain ends

Steel, buttweld		
½-in.	49½	35
¾-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
½-in.	+ 2½	+23
¾-in.	3½	+17
1 to 2-in.	13	+ 7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ to 6-in.	54½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+ ½
4½ to 6-in.	13	+ 5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$85.06
6-in. to 24-in. del'd New York	83.30
6-in. to 24-in., Birmingham	74.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	98.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Percent Off List
½ in. & smaller x 6 in. & shorter	45
9/16 & ⅝ in. x 6 in. & shorter	46
¾ in. & larger x 6 in. & shorter	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long	44
Lag, all diam x 6 in. & shorter	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	43
9/16 to 1 in. inclusive	42
1⅛ to 1½ in. inclusive	40
1⅝ in. and larger	35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller	....	46
½ in. and smaller	44	..
½ in. through 1 in.	....	44
9/16 in. through 1 in.	43	..
1⅛ in. through 1½ in.	41	42
1⅝ in and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate .... 65 and 10
In bulk 75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets *(½ in. and larger)*

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $5.65
F.o.b. Lebanon, Pa. 5.80

Small Rivets *(7/16 in. and smaller)*

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 55

Cap and Set Screws

(In packages) *Percent Off List*

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
¾ to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, cup and oval points	57
Milled studs	43
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	37

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots	10¢ to 17¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	35¢ to 37¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	29¢ to 32¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200, & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	49¢
Nickel, 100 mesh	51½¢
Silicon, 100 mesh	26¢
Solder powder, 100 mesh	8½¢ plus metal
Stainless steel, 302, minus 100 mesh	75¢
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$3.05
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa.	$12.00 to $13.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	$17.10
Chicago, f.o.b.	16.10
New England, del'd	19.75
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	16.75
Swedeland, Pa., f.o.b.	16.75
Buffalo, del'd	18.75
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	16.75
Cleveland, del'd	17.90
Cincinnati, del'd	15.39
St. Louis, del'd	18.03
Birmingham, del'd	15.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Carloads, Per 1000

No. 1, Ohio	$64.00
First quality, Pa., Md., Ky., Mo., Ohio	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo, Ohio	64.00
Sec. quality, New Jersey	59.00
No. 2, Ohio	56.00
Ground fire clay, net ton, bulk	10.00

Silica Brick

Pennsylvania and Birmingham	$70.00
Chicago District and Alabama	79.00
Silica cement, net ton (Eastern)	12.00
East Chicago	13.00

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Plymouth Meeting, Chester $59.00

Magnesite Brick

Standard, Balt. and Chester $81.00
Chemically bonded, Baltimore 70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest; add 10¢; Missouri Valley; add 20¢ .. $11.05

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.44	$5.18	$5.69	$4.73	$5.28	$4.79	$4.52	$4.78	$5.48	$8.32	$8.42	$9.83	$9.93
New York	4.71	5.72[1]	6.11	5.03	5.95	5.06	4.75	5.02	5.57	8.40	8.50	9.92	10.05
Boston	4.70	5.57[12]	5.50[12]	4.70	6.71	5.05	4.77	4.92	5.57	8.62	8.72	9.98	10.08
Baltimore	4.31	....	5.54	4.76	....	4.76	4.68	4.81	5.61	....	....	....	....
Norfolk	4.75	....	....	5.15	....	5.00	5.00	5.05	5.85	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.05	8.15	9.30	9.40
Milwaukee	4.399	5.249[1]	5.799	4.499	5.599	4.749	4.549	4.549	5.249	8.349	8.449	9.599	9.699
Cleveland	3.95	4.55	5.238	4.188	5.00	4.25†	4.311	4.10	4.95	8.308	8.408	9.30	9.40
Buffalo	4.25	5.10	5.95	4.65	5.61[5]	4.90	4.40	4.40	5.10	8.05	8.15	9.30	9.40
Detroit	4.35	5.20	5.97	4.64	5.59	4.84†	4.72	4.50	5.22	8.46	8.56	9.69	9.79
Cincinnati	4.471	5.166	5.166	4.694	....	4.903	4.744	4.703	5.403	....	....	....	....
St. Louis	4.549	5.399[1]	5.974	4.649	5.774	4.899	4.699	4.699	5.424	8.524	8.624	9.774	9.87
Pittsburgh	4.25	5.10[1]	5.65	4.35	4.95	4.60	4.40	4.40	4.95	8.05	8.15	9.30	9.40
St. Paul	4.584[7]	5.434[1]	5.834[2]	4.684[7]	....	4.884[7]	4.734[7]	4.734[7]	4.826[6]	....	....	....	....
Omaha	5.165	....	6.565	5.265	....	5.515	5.315	5.315	6.015	....	....	....	....
Indianapolis	4.51	5.29	5.84	4.61	5.46	4.86	4.66	4.65	5.36	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	5.93	....	....	....	....
Memphis	4.77[11]	5.79[11]	6.32	4.97[11]	....	5.12[11]	4.92[11]	4.92[11]	5.79	....	....	....	....
New Orleans	*4.98[11]	6.29[1]	....	5.18[11]	....	5.33[11]	*5.03[11]	*5.13[11]	6.29[6]	....	....	....	....
Houston	5.30	....	6.60	5.25	....	5.35	5.15	5.30	6.60	8.75[16]	8.55[16]	9.70[16]	9.80[16]
Los Angeles	5.65	7.35[1]	7.30	5.95	8.70[5]	5.40	5.25	5.40	7.25[14]	9.90[15]	9.60[15]	11.35[15]	11.35[1]
San Francisco	5.20[8]	6.65	6.85	5.50[8]	....	5.30	5.20	5.05	7.35[10]	....	....	....	....
Seattle	5.30[4]	7.10[3]	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.45[4]	7.45[14]	....	9.75[6]	....	11.10[6]
Portland	5.30[4]	....	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.55[4]	7.45[14]	....	....	....	....
Salt Lake City	6.25	....	7.50	6.75	....	6.10	6.25	6.35	7.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 450 to 1499 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	37.00	37.50	38.00	38.50	.....
Birdsboro	40.00	40.50	41.00	41.50	45.00
Birmingham	32.88–35.88	33.38–36.38	.....	.....	.....
Buffalo	36.00–37.50*	36.00–38.00*	36.50–38.50*	.....	.....
Chicago	35.50	36.00	36.50	37.00	.....
Cleveland	35.50–42.25*	36.00–42.75*	36.50–43.25*	.....	.....
Duluth	36.00	36.50	37.00	37.50	.....
Erie	35.50	36.00	36.50	37.00	.....
Everett	.....	45.00	45.50	.....	.....
Granite City	36.50	37.00	37.00	.....	.....
Neville Island	36.00	36.50	36.50	37.00	.....
Provo	37.00	37.50	.....	.....	.....
Sharpsville	36.00	36.50	36.50	37.00	.....
Steelton	37.00	.....	.....	.....	42.00
Struthers, Ohio	36.50	.....	.....	.....	.....
Swedeland	41.00	41.50	42.00	42.50	.....
Toledo	35.50	36.00	36.50	37.00	.....
Troy, N. Y.	37.00	37.50	38.00	38.50	42.00
Youngstown	36.00	36.50	36.50	37.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	45.50	46.00	.....	.....
Boston	Steelton	5.30	.....	.....	.....	.....	47.30
Brooklyn	Bethlehem	3.30	40.30	40.80	41.30	41.80	.....
Brooklyn	Birdsboro	3.85	43.85	44.35	44 85	45.35	48.85
Cincinnati	Birmingham	5.36	38.24–41.25	38.74–41.74	.....	.....	.....
Jersey City	Bethlehem	2.02	39.02	39.52	40.02	40.52	.....
Jersey City	Birdsboro	2.56	.....	.....	.....	.....	47.56
Los Angeles	Provo	6.53	43.53	44.03	.....	.....	.....
Mansfield	Cleveland-Toledo	2.56	38.06–44.81*	38.56–45.31*	39.06–45.81*	39.56	.....
Philadelphia	Bethlehem	1.84	38.84	39.34	39.84	40.34	.....
Philadelphia	Swedeland	1.11	42.11	42.61	43.11	43.61	.....
Philadelphia	Birdsboro	1.64	41.64	42.14	42.64	43.16	46.64
Philadelphia	Steelton	2.38	39.38	.....	.....	.....	44.38
San Francisco	Provo	6.53	43.53	44.03	.....	.....	.....
Seattle	Provo	6.53	43.53	44 03	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	37.25	37.75	37.75	.....	.....

* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$45.50; f.o.b. Buffalo — $46.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $50.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $56.04. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk) $145
Less ton lots (packed) 172.00
Delivered Pittsburgh 151.00

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk ...	8.00	8.25	8.80
Ton lots	9.00	9.60	11.50
Less ton lots ...	9.40	10.00	11.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk 32
L.c.l. lots 34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads 32
Ton lots 34
Less ton lots 36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C. 0.06% P, 90% Mn	23.00	24.10	24.70
0.10% max. C	22.50	23.60	24.20
0.15% max. C	22.00	23.10	23.70
0.30% max. C	21.50	22.60	23.20
0.50% max. C	21.00	22.10	22.70
0.75% max. C, 7.00% max. Si.....	18.00	19.10	19.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk 7.40
Ton lots 8.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet 7.65
Ton lots 8.65
Less ton lots 9.05

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $73.00 f.o.b. Keokuk, Iowa; $73.75 f.o.b. Niagara Falls; $70.75, f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe..	18.50	19.85	21.60
97% Si, 1% Fe..	18.00	20.25	22.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk ..	4.80	5.05	5.25
Ton lots	5.80	6.40	6.70
Less ton lots ...	6.20	6.80	7.10

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.00	15.65	15.90
50% Si	8.80	9.30	9.50
75% Si	11.20	11.50	12.25
80-90% Si	12.70	13.00	13.75
90-95% Si	14.35	14.65	15.35

Ferrochrome (65-72% *Cr, 2% max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	25.00	25.40	26.00
0.10% C	24.50	24.90	25.50
0.15% C	24.00	24.40	25.00
0.20% C	23.75	24.15	24.25
0.50% C	23.50	23.90	24.00
1.00% C	23.00	23.40	23.50
2.00% C	22.50	22.90	23.00
65-69% Cr, 4.9% C	17.60	18.00	18.15
62-66% Cr. 4-6% C. 6-9% Si.	18.60	19.00	19.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk ...	11.10	11.35	11.45
Ton lots	12.00	12.90	13.50
Less ton lots ..	12.40	13.30	13.90

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump sie, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	18.70	19.10	19.25
Ton lots	19.90	21.20	22.00
Less ton lots ...	20.60	21.90	22.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	23.00	23.40	23.50
Ton lots	24.35	25.00	26.20
Less ton lots ...	25.35	26.00	27.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C..	91.00	92.50	93.75
0.50% max. C...	87.00	88.50	89.75
9.00% min. C ...	87.50	89.00	91.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.35	20.50
Less ton lots ...	18.60	19.35	21.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	16.75	17.25	19.30
Ton lots	18.85	19.70	21.45
Less ton lots ...	19.85	20.70	22.45

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.85	$2.70	$3.40
Less ton lots ...	2.20	3.05	4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr. 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	17.25	18.35	20.30
Less ton lots ...	18.00	19.10	21.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.05	16.15	18.10
Less ton lots ...	15.80	16.90	18.85

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed.. $2.50

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.
Openhearth $2.90
Crucible 3.00
High speed steel (Primos).. 3.10

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5 $1.20

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb
Ton lots $2.50
Less ton lots $2.55

Ferromolybdenum, 55-75%, f.o.b Langeloth, Washington, Pa., per pound contained Mo. ..... 95¢

Calcium molybdate, 40-45%, f.o.b Langeloth, Washington, Pa., Per pound contained Mo. ..... 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo..... 80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo..... 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti $1.23
Less ton lots $1.25

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti $1.35
Less ton lots $1.40

High carbon ferotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton....$142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton $65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Carload lots ..... 18.40¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy
Carload, bulk ..... 6.00¢

Alsifer, 20% Al, 40% Si, 40% Ft, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 6.50¢
Ton lots ..... 7.00¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Car lots ..... 9.00¢
Ton lots ..... 9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots..	$1.30	$1.3075	$1.329

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots ...	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots..	$1.80	$1.8125	$1.8445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.
Carload lots ..... 37.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.
No. 1 ..... 87.5¢
No. 6 ..... 60¢
No. 79 ..... 45¢

Bortram, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0% Al 1.0—2.0%.
Ton lots, per pound ..... 8.0¢